CAROLINA

p l a n n i n g

SPECIAL ISSUE: PLANNING OUR COAST

Issues and trends affecting the coastal region of the Southeast. Featuring articles and opinion pieces from:

Richard Norton ◆ Joan Altman ◆ Richard Bierly ◆ Todd Miller and Jim Stephenson ◆ Anna Schwab and Margaret Anders ◆ Rachael Franks ◆ Aaron McKown and Donna Moffitt

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From the Editors:

North Carolina's coast has been in the news a lot lately, prompting many of our readers to call for an issue of Carolina Planning devoted entirely to coastal zone management and hazard mitigation. A recent spate of hurricanes reinvigorated an ongoing debate about coastal development in North Carolina. At about the same time, the state's Coastal Resources Commission established a Planning Review Team in response to controversy over the effectiveness of state-mandated local land use planning. Given these developments, we've limited the scope of this collection of articles to North Carolina, with the hopeful assumption that lessons learned here will be helpful to planners all along the Atlantic and Gulf coasts.

The first few pieces attempt to get at the root of the successes and failures of the Coastal Area Management Act and the local planning process it created. Richard Norton introduces us to this process and dissects the seemingly simple matter of creating and implementing a good CAMA plan. Joan Altman, an elected local official in coastal North Carolina, and Richard Bierly, president of a coastal environmental interest group, then provide their own assessments of the CAMA process, drawing from their experiences with the program.

The remainder of the issue presents a sampling of articles that highlight the significance of the natural environment to planning in coastal regions. Todd Miller and Jim Stephenson talk about "the trouble with storms," while Anna Schwab and Margaret Anders offer possible remedies to that trouble in an evaluation of various mitigation strategies. Rachael Franks examines the role that EPA storm water regulations can play in the management of the region's coastal waters. Finally, Aaron McKown and Donna Moffit outline some of the steps taken to help North Carolina homeowners regroup post-disaster.

With the hope that this special issue generates a bit of healthy debate on the matter, we will add a Letters to the Editor section to our next issue. We look forward to hearing from you.

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A house threatened by erosion on the Point of Emerald Isle. *Photo by Carolina Environmental Diversity Explorations.*

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Planner's Digest

Hurricane Floyd Recovery Efforts: An Update

Amanda Huron

In September of 1999, eastern North Carolina was hit by several torrential hurricanes, the most disastrous of which was Hurricane Floyd. Fifty-one people were killed by the storms, and over 57,000 dwellings were damaged or destroyed. Sixty-six of the state's 100 counties were designated as federal disaster areas. A year later, the region is slowly recovering from the floods, and officials are working on ways to better prepare for such disasters in the future.

Mapping After Floyd

The extent of the devastation wrought by Hurricane Floyd caught planners by surprise, in part because of the state's inaccurate, out-of-date floodplain maps. More than half of these maps are over ten years old and have not been modified to incorporate landscape changes caused by new development. Worse yet, more than 70 towns in Floyd's path had no floodplain maps at all.

State officials are now beginning to update old maps with the help of NASA. Researchers are using an experimental mapping method in which land elevation is charted through pulses of laser light beamed from planes. This new laser technology will enable the state to speed the mapmaking process; officials predict that maps of eastern North Carolina will be finished in two years and that the entire state will be mapped within five years. Mapping eastern North Carolina alone will cost over $25 million, with the funding coming from both state and federal sources.

Officials hope that updating the maps so that they more accurately portray flood risks will prompt more homeowners to buy flood insurance. The new maps will also enable developers to know how close they are building to flood levels. Finally, the new information will help the state to better prepare for flooding in the future.

Housing Flood Victims

In August, workers demolished the first two houses on land acquired through the Hazard Mitigation Grant Program. The program, commonly referred to as "The Buyout," uses 25 percent state funds and 75 percent federal funds to buy properties that lie in the path of potential floods and other natural disasters.

The property on which the houses sat now belongs to the town of Wilson, North Carolina, and will become permanent open greenspace. The former owners will use their payment to buy another house in the town, outside the flood risk area. Wilson has received $11.5 million in hazard mitigation funds to buy 196 of the town's most damaged homes and is applying for an additional $6.9 million from the Federal Emergency Management Agency (FEMA) in order to purchase and condemn 206 more houses. The State of North Carolina has submitted $97 million in housing buyout applications to FEMA and plans to buy more than 4,300 homes at a cost of $261.4 million, making this one of the largest buyout programs in the nation's history.

Also in August, contractors broke ground on a subdivision in Rocky Mount that will provide 230 homes, priced at $88,000, for families displaced by Floyd. The project is the first successful collaboration between a private

developer and state and local governments to provide new housing for flood victims.

Relief efforts have been criticized for not placing enough emphasis on the housing needs of renters. In response, the state recently created a $10 million program to provide new rental housing in flood-damaged areas. The City of Greenville will also receive $1.8 million in federal funds to repair 216 damaged units of public housing.

Hog Waste Agreement

One of the fouler effects of Hurricane Floyd was the flooding of more than 50 hog waste lagoons. While open-air lagoons are the easiest, cheapest way for farmers to dispose of hog waste, they have long been controversial for their potential to seriously pollute the state's rivers and streams when they break or flood. The flooding and resulting pollution caused by Floyd ultimately prompted action on the matter.

In July, Smithfield Foods, the state's largest hog producer, agreed to phase out hog lagoons and spend $65 million to develop alternative methods of handling hog waste. The Virginia-based company, which employs 30,800 people, controls about 70 percent of North Carolina's pork production. Smithfield will install new waste treatment systems on its 276 farms within three years of state approval of a conversion plan. The agreement, however, does not apply to farms that produce under contract for Smithfield, and most of the lagoons are located on these contract farms. Nor does it cover companies that produce the remaining 30 percent of pork in the state.

In an effort to craft a more comprehensive solution, the state recently announced a buyout program focused specifically on smaller hog farm operations. Fourteen farmers in flood-prone areas will be paid a total of $4 million to stop using their land to store hog waste. The state will clean up these waste lagoons, and the landowners will be prohibited from using their property as anything other than irrigation or fishing ponds, fields or pastures. Payments will range from $75,000 to $695,000, enabling many of the small-scale farmers who have not been able to compete with larger corporations to leave the hog raising business.

No Post-Floyd Boom

Often a natural disaster results in an mini-economic boom for the affected areas. After Hurricane Fran hit North Carolina in 1996, sales-tax collections spiked in the hardest-hit areas as homeowners and businesses rushed to rebuild and replace destroyed property. Yet, nearly a year after Floyd, the flooded areas of eastern North Carolina have yet to experience such a boost. Sales-tax collections have actually fallen in counties that were most damaged, the housing starts have remained unchanged or even dropped in some areas.

Analysts predict that there will be little, if any, economic upswing associated with Floyd. The primary reason is that the counties that were the most damaged were struggling even before the storm hit. Eastern North Carolina's farms and factories have been closing for years, leaving behind those who could not afford to move. The poverty rate in many of these counties is approximately 20 percent. Moreover, only 13 percent of the homes destroyed by Floyd were insured. In contrast, the areas hit by Hurricane Fran — mainly beach communities and the Research Triangle area — were relatively wealthy, and most victims were either insured or had the financial resources to quickly begin building anew. CP

Sources: The Raleigh News & Observer and the Hurricane Floyd Redevelopment Center

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What Does it Mean to Implement a CAMA Land Use Plan Anyway?

Richard K. Norton

County and municipal governments in coastal North Carolina have been preparing local land use plans under the state's Coastal Area Management Act (CAMA) program for almost 25 years. Local planning has always been viewed as an important part of that larger coastal management program. Both the larger program in general and local planning in particular, however, have recently become mired in controversy as the state and coastal localities attempt to address "explosive population growth and unexpected environmental dangers [that] continue to threaten the coast" (NC CFC 1994: ES-1). Much of that controversy revolves around differing interpretations of what, exactly, the state can require of the localities through its planning mandates, whether the plans being produced under those mandates are good plans, and whether the localities themselves are actually implementing their plans.

Perhaps the sharpest disagreements on these questions come from debates that place local governments in the coastal region collectively at odds with the region's environmental interest group community. Simplifying the arguments a bit to illustrate, many localities assert both that their CAMA land use plans are good plans—they comply with the state's planning mandates and meet community needs—and that they implement their plans by using them when making local land use related policy decisions. In contrast, members of the coastal environmental interest group community assert that local CAMA plans, by-and-large, are not good plans because they do not adequately address the continued loss and degradation of regionally significant coastal resources in any rigorous way. The environmental community asserts further that to the extent that localities do appear to address environmental issues through their plans, they fail to follow through by actually implementing those plans.

Not surprisingly, these parties to the debate see very different sources behind the CAMA land use planning controversy and very different ways out of that controversy. In general, local governments want more flexibility to address more effectively their unique local conditions. Environmentalists, in contrast, want to tighten down on the state's planning requirements in order to compel local governments to address environmental issues in a more meaningful way. Local governments point to CAMA permitting requirements and the state's other environmental protection programs as the appropriate mechanism for ensuring adequate coastal resource protection. Environmentalists, again in contrast, assert that CAMA requires (or should

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require) that local governments address coastal resource protection directly and more rigorously through their plans. Finally, local governments tend to see their CAMA plans more like vision statements, where the plan provides analyses and policies designed to help the community meet aspirational goals. Environmentalists believe that CAMA plans should be more prescriptive rather than exhortative in directing appropriate land development patterns, particularly for the purpose of providing adequate coastal resource protection.

All of the parties to this debate generally agree that there is room to improve the local planning process under CAMA so that the plans produced are both better and better implemented, although the extent to which such improvements are needed is probably contestable. Disagreement most clearly arises, however, on the questions of what makes for a "good" local CAMA land use plan in the first place and what it means to actually "implement" a CAMA plan in the second. These seemingly straightforward questions are not so simple under the surface, especially when thinking about a *state-mandated* local planning program and placing it in the context of North Carolina's legal, institutional and political setting and history. But if North Carolina's coastal community, taken altogether, is to reach some level of workable consensus on how local CAMA land use planning and plan implementation efforts ought to be (or can be) improved, the community will first need to reach some level of workable consensus on what qualifies as a good local land use plan and what good plan implementation efforts look like.

As described in more detail below, the North Carolina Coastal Resources Commission established a Planning Review Team in late 1998 that has been revisiting the local CAMA land use planning program in response to the controversy surrounding it. As part of that effort, the Planning Review Team has been struggling with a number of difficult questions.[1] Several fundamental points of disagreement in particular have persisted throughout those efforts, including in essence the core questions of what makes for a good local CAMA plan, what makes for successful local CAMA plan implementation, and how the state can best facilitate both. The purpose of this paper is not so much to suggest answers to these thorny questions as it is to point out and discuss some of the conceptual issues and difficulties raised when asking them. Reaching a better understanding of what makes for a good plan and what it means to implement that plan successfully will hopefully contribute to the coastal community's efforts to find answers upon which all, or at least most, can agree.

This paper first presents a brief history of the CAMA land use planning program, and the recent controversy leading up to efforts to revisit that program, in order to provide some context. The paper then draws from a relatively small but growing academic literature on land use plan implementation and state-mandated growth management programs in order to discuss what a good plan and successful plan implementation mean and how they are related. The paper then offers some thoughts about how local CAMA land use planning fits into the larger North Carolina coastal management picture, what plan implementation means in the CAMA context, and what issues will need to be resolved in order to structure and administer a state-mandated local land use planning program that produces both good local plans and successful plan implementation efforts.

Local Land Use Planning under the Coastal Area Management Act

In 1974, the North Carolina General Assembly enacted the Coastal Area Management Act[2] in response to a quickening pace of development throughout the coastal region that threatened both the integrity of the region's natural systems and its historical, social and cultural resources (Owens 1985). While the enactment of CAMA was not easy—debate was spirited and extended over two legislative sessions—the act established a visionary comprehensive regional resource management program for the state's twenty-county coastal area (see Heath 1974; US DOC 1978; Lowry 1985; Owens 1985; Heath and Owens 1994). Since that time, the CAMA program has evolved and now comprises an integrated, four-part program, including a regulatory permitting

program for "areas of environmental concern" (AECs), a local land use planning program, a state-to-local grants-in-aid program, and a coastal land area reserves program[3] (Owens 1985; Moffitt 2000). CAMA established a quasi-legislative, quasi-judicial policy-making "citizen commission," the Coastal Resources Commission (CRC), to implement the act, with advice from a larger "Coastal Resources Advisory Council" (CRAC) and administrative support provided by the North Carolina Division of Coastal Management (DCM).[4]

From its very inception, and perhaps because of the ambitious goal of creating a "comprehensive coordinated approach for the protection, preservation, and orderly development of the State's coastal resources" (US DOC 1978:54), the state's coastal management program actually consists of a complex, at least theoretically coordinated system of resource management laws, state policies and executive orders, as well as the mandates of CAMA itself. With regard to CAMA specifically, the program establishes a fairly complex approach for striking a balance between environmental protection and economic development that relies primarily on the combined and coordinated AEC regulatory permitting program and local land use planning program. State regulatory authority under CAMA is focused on the AECs, although the combined land areas designated as such have comprised until recently only about three percent of the entire coastal region (Owens 1985).[5] Local land use planning under the act, on the other hand, has always played a major role in advancing the goals of the act, but it is difficult to decipher exactly how its role was originally intended to function in relation to the CAMA permitting program and the state's other regulatory programs (see US DOC 1978:202-23). This is especially true, and especially important given the extent of the area involved, with regard to land use activities taking place outside of AECs that might have the potential to consume fragile coastal resources or degrade coastal water quality. In particular, it is not entirely clear what the state could and should require of localities substantively in terms of their efforts to protect coastal resources through their local CAMA plans, especially with regard to areas outside of AECs. Nor is it entirely clear how those expectations might change over time with changed conditions and improved knowledge regarding the link between local land use policy decisions and environmental outcomes.[6]

Nonetheless, as the entire CAMA program has become established, knowledgeable observers like Heath and Owens (1994) have identified the need to improve the program, and in particular the local land use planning program, in several key ways, especially with regard to water quality, cumulative and secondary impacts, and the promotion of sustainable development. More prominently, a special Coastal Futures Committee created in 1994 by the Governor as part of the "Year of the Coast," charged with assessing the management of the coastal area and charting a course for carrying coastal management into the future (NC CFC 1994:87), also found the need for a similar expansion of the planning program. Citing "explosive population growth and unexpected environmental dangers" that continue to threaten coastal resources (*id.* at ES-1), this special committee put forward a number of recommendations, listing first and foremost as "among the most important" a variety of recommendations that focus on the CAMA planning program in order to improve both the preparation and implementation of those plans for the purpose of improving environmental protection (*id.* at ES-2).[7]

More recently, given these persistent environmental problems and at least in part because of the Coastal Futures Committee's emphasis on local land use planning, controversy over the local planning program has erupted. As explained by DCM: "Despite the land use planning program's success, it has fallen under criticism from opposing sides in recent years. Environmentalists are concerned that the state program does not go far enough to protect coastal resources. On the other side, local governments feel that they have the best knowledge of their towns and should hve more autonomy in their planning. Critics on both sides of the issue have complained about complicated guidelines, one-size-fits-all regulations, lack of

implementation of local plans, and inadequate public participation and understanding of the planning program."[8]

Responding to this controversy, the CRC in 1998 placed a moratorium on the local land use planning process and established a Planning Review Team. It charged that group with reviewing the planning program and the state's planning guidelines and preparing recommendations to restructure that program into one that will better address concerns about CAMA planning and better support the goals of CAMA.[9] One key focus of the Coastal Futures Committee's recommendations regarding the land use planning program, which has served at least in part to focus the Planning Review Team's efforts, is that the program be restructured so that the localities produce "high quality" plans—plans that do a better job of, among other things, considering issues affecting basin-wide water quality protection and regional economic development strategies and considering the cumulative and secondary impacts of growth (see NC CFC 1994:ES-2). A second key focus, one closely related, is that the program be restructured so that local governments produce and "successfully implement" their CAMA land use plans (*id.*). A number of approaches for achieving both of these outcomes have been put forth and debated. Before reaching agreement on an appropriate solution, however, it may be helpful to step back and ask first—what does a high quality plan look like and what makes for implementation success? The next section draws from the academic literature to tease apart some of the subtleties of these questions and lay the ground work for thinking about them in the context of local CAMA land use planning.

Plan Making and Implementation from an Academic Perspective

By-and-large, planning scholars have focused much of their attention on the process of planning rather than the quality or use of the plans produced. Indeed, despite much exhortation on the need to focus on plan content, few empirical studies until recently have focused on characterizing or measuring systematically the quality of plans (Dalton and Burby 1994). Moreover, while scholars in the fields of political science, public administration and public policy have generated a considerable body of research on the implementation of programs and policies, surprisingly little parallel work has been done by planning scholars on how well or in what ways plans themselves are actually implemented once produced (Talen 1996).

The work on both plan content and plan implementation that has been done has quickly stumbled into a number of theoretical and concept measurement difficulties, raising questions that are straightforward on the surface yet analytically complex, such as: What purpose does (or should) planning serve? What purposes do (or should) plans serve? How do we evaluate whether a plan is "good" or not? How do we evaluate whether the plan actually advances its stated goals? How do we evaluate how much and how well a plan has actually been implemented? Moreover, in addressing this last question in particular, it is important to bear in mind that plan making and plan implementation are inseparable concepts. Because planning is, at least ideally, a continuous and iterative process, with plan making followed by monitoring, evaluation and updating efforts, assessments of plan implementation necessarily involve questions of plan content and quality. In other words, as part of asking how well a plan has been implemented, one must ask what the plan proposed to do, how well it justified its proposed course of action, and to what extent it was structured to facilitate implementation in the first place.

Characterizing Plan Quality and Implementation Success

Talen (1996) and Baer (1997) have both surveyed implementation research in the public administration, public policy and planning literatures and have articulated typologies that link plan making, plan quality and plan implementation. Focusing more on the planning literature, Baer (1997) articulates a conceptual framework that separates planning and plan implementation analysis essentially into two fundamental components—analysis of plan making, what he calls "plan evaluation," and

analysis of the outcomes of plan implementation, what he calls "post hoc evaluation." Plan evaluation involves making various assessments in building the plan, testing plan policy alternatives, and critiquing the plan (often done by outside researchers). These analyses speak primarily to the quality of the plan making effort and of the plan itself. Assessing plan quality from a critical or scholarly approach in particular may involve asking whether the plan policies appear to correspond to and advance the articulated plan goals (an internal quality), comparing plans across different localities (a comparative quality), and/or asking to what extent plan policies correspond to external or independent criteria, such as how well the plan will advance hazard mitigation or water quality protection (a standard-based quality).

Baer characterizes post hoc evaluations as involving the assessment of what the intended result or effect of the plan was and to what extent that result was achieved. The assessment of results necessitates asking whether the plan was essentially intended to serve as a "blueprint" for development or, at the other extreme, what might be referred to as a "vision statement"—a document merely (or at best) to be consulted and cited in working through the land use decision-making process (see Alexander and Faludi 1989). Asking to what extent the plan's goals were achieved, in turn, necessitates asking—as compared to what? Plan implementation outcomes might be compared, for example, to what was proposed–what Baer (1997:334) notes is the "normal view of plan evaluation"–or what might have occurred had there been no plan in the first place. Although not specifically addressed by Baer, implementation outcomes might also be assessed by comparing what happened in reality as compared to what might have happened had the plan itself been "better"—had it employed stronger policies or implementation measures.

Talen (1996) provides somewhat more history on the development of implementation theory across the several disciplines, focusing in particular on the question of whether quantitative and qualitative methods might be developed to more systematically and rigorously evaluate whether a plan has been implemented successfully. Noting the difficulty inherent in predicting and molding future development, she surveys a number of approaches that have been taken to evaluate plan implementation quantitatively, such as Alterman and Hill's (1978) efforts to use grid overlays to quantify consistency between plans and actual land use, Calkins' (1979) algebraic formula for characterizing "total change" as a function of "planned change" and "unplanned change," and more recent work by Bryson et al. (1990) using regression analysis to assess the achievement of planning goals.

Talen also addresses the difficulty of characterizing the meaning of plan implementation "success" or goal achievement and does so in a way that speaks to the distinction drawn by Baer with regard to the purpose of a plan. On the one hand, if the purpose of a plan is to serve more like a blueprint, then measuring success is more of a linear process that rigidly measures plan policies against outcomes. On the other hand, if the purpose of a plan is to serve more like a vision statement, then measuring implementation success entails a more loosely defined assessment of goal achievement.[10] Despite these divergent orientations, and despite the analytical difficulties of determining the causes of planning outcomes given the ever-increasing geographic, social and fiscal complexities of land development, Talen asserts that it is possible to more rigorously evaluate plan implementation outcomes. Moreover, she asserts that undertaking such rigorous evaluation of planning outcomes, in effect merging assessment of both the process employed and the substantive goals achieved, is absolutely necessary if we are to truly evaluate the effectiveness of local planning efforts.

In the Context of State-Mandated Planning

The works of Baer and Talen are both more theoretical, designed to help scholars reconceptualize what "plan quality" and "planning implementation success" mean and how they might be measured. A second, empirical body of work has also recently appeared in the planning literature. Much of this

work is based on, or has been conducted in response to, the published findings from an extensive research project headed by planning scholar Raymond Burby.[11] This research project focused on local efforts to plan for and mitigate natural hazards, an issue of universal concern and one that can necessitate making difficult land use development decisions. The project studied local planning efforts in five different states, including: North Carolina, Florida, and California—all with local planning mandates that cover their coastal areas; and Texas and Washington—neither having a local planning mandate at that time (Washington has since enacted such a program).[12] This body of work speaks especially to the question of plan content and plan implementation (defined as development management program development) in the context of state-mandated local hazards mitigation planning programs.

Building largely from Kaiser, Godschalk and Chapin's (1995) well known text on land use planning, these researchers generally characterize high-quality plans as those that demonstrate a strong factual basis, provide clearly articulated goals, and employ policies that both are directive (i.e., directing decision-makers to do something rather than exhorting them to support something) and appropriate (i.e., reasonably calculated to actually effect the desired plan goals). Strong plans also incorporate the concept of spatial specificity—clearly relating policies to geographically identified areas—and several types of consistency, including "internal" (between facts, goals and policy), "horizontal" (between the locality and neighboring jurisdictions), and "vertical" (between the locality and state and federal mandates). A final aspect of plan quality, one that has not been culled out and emphasized as a separate factor in the empirical literature, includes the extent to which the plan incorporates ongoing monitoring and evaluation procedures, particularly in terms of assessing past implementation success at the front end of a plan update effort (see Kaiser, Godschalk and Chapin 1995).

Closely related to the concept of plan quality more generally is the notion of development management planning. Development management planning efforts (or programs) are essentially designed specifically to limit and/or control land use development patterns so as to achieve management-oriented substantive goals like hazard mitigation, natural resource protection and/or the adequate and efficient provision of community services (Kaiser, Godschalk and Chapin 1995; Landis 1992). In general terms, therefore, strong development management plans (as well as programs developed independently or derived from those plans) have the same attributes of high-quality plans as described above and may have additional components like coordinated capital improvement programs and land acquisition programs (Kaiser, Godschalk and Chapin 1995). In the recent empirical literature on plan implementation, strong development management programs designed to address hazard mitigation have been defined as those that employ a balanced mix of land use controls, site design requirements, building standards, and knowledge enhancement techniques (Dalton and Burby 1994). Such programs, when balanced so as to rely as much or more so on land use controls and site design requirements as on knowledge-building techniques, have also been characterized as more sophisticated, tending to be more anticipatory or preventative in focus rather than passive or reactive (*id.*).

Drawing from this work in particular and the planning literature on implementation and growth management more generally, several sets of key policy-related factors[13] appear to influence the implementation of state-mandated local land use planning efforts. These include the state's planning mandate, with regard in particular to the complexity and emphasis of that mandate; the state's administrative policy and oversight of local planning efforts; state capacity-building, technical assistance, and outreach or education efforts; local capacity for and commitment to planning; and finally, with regard to plan implementation efforts in particular, the quality of the plan itself.[14] Table 1 lists these factors, along with local situational factors that appear to be most important, and briefly describes their function. The table also notes the source or sources in the literature that discuss the operation

of each variable most directly or thoroughly.

Some General Answers

Boiling this academic literature down, it is possible to provide some initial and general answers to the questions at hand—what makes for a good plan and what does implementation success mean. First, a "good" local land use plan can be defined as one that employs a strong factual base, provides clearly articulated goals, presents strong policy statements, and specifies a reasonable development management program (and/or implementation and monitoring program) that clearly establishes mechanisms, responsibilities and time frames for implementing the plan. The policies of a good land use plan in particular are directive rather than merely exhortatory, reasonably calculated to achieve the plan's stated goals, and spatially-specific. Evaluating whether a plan is good or not, in turn, requires thinking about what purpose the plan is to serve (i.e., vision-statement, blueprint, or something in between) and whether it speaks to that purpose taken as a whole; thinking about whether the plan "hangs together" (i.e., whether the facts, goals, policies, and implementation program are coherent and internally consistent); and possibly setting the plan against other plans for comparison. Answering all of these questions and concluding whether a plan is good also requires thinking both in terms of process (did the planning team take all of the right steps and conduct the right kinds of analyses in preparing the plan?) and substance (is the plan taken as a whole reasonably designed to advance the community's goals?).

Second, successful plan implementation can be determined by asking, in a larger sense, whether the way the plan is used in practice squares with the way it was intended to be used in light of its intended purpose or function (i.e., vision statement, blueprint, or something in between). In other words, does the locality consult and use the plan as intended when enacting or revising local land use ordinances, making site-specific land use-related policy decisions, or making capital improvement decisions? In a more narrow sense, successful plan implementation can be determined by asking whether specific policies have been followed or carried out. More particularly, successful land use plan implementation occurs when the locality's adopted development management program components—whether they include land use ordinances (e.g., zoning, subdivision), site design requirements, building standards, outreach and education efforts, or some combination of these and/or other efforts—serve to carry out and are consistent with the land use classifications and policies established by the plan. Evaluating whether implementation has been successful, in turn, requires assessing to what extent and in what ways the on-the-ground land use development outcomes compare with what the plan itself called for. It might also involve thinking about what might have been had there been no plan or what might have been had the plan been different. And again, answering all of these questions requires thinking both in terms of process (did the locality do all of the things the plan called for?) and substance (are the on-the-ground outcomes consistent with what the community hoped to achieve?).

In addition to the questions of plan quality and implementation success generally, the academic literature also sheds light on what the *state* can do to facilitate local planning efforts so that they produce high quality plans and yield successful plan implementation. Before discussing the important factors at play, however, it would be useful to make explicit and consider an important distinction that is reflected implicitly in that literature. The distinction to be drawn is whether the planning effort in question was initiated locally, presumably to promote primarily local goals, or initiated by the state, not only to facilitate good local planning but also expressly for the purpose of prompting local governments to internalize transboundary regional concerns or state-level goals.

Specifically, one thread of this academic work has addressed the questions of what it means in general to make a good local land use plan and to implement that plan, as well as how those implementation efforts might be evaluated rigorously. This first body of work comes out of a more traditional view of what planning is and what it aspires to do. That is, planning is seen

Table 1. Principal factors that appear to affect the outcomes of state-mandated local plan making and plan implementation efforts as synthesized from the planning literature

Outcomes are a function of:	*Operating in the following way:**	*Primary Source(s):*
1. The state's growth management program and/or local planning mandate.	Through the clarity, prescriptiveness, and specificity of the mandate regarding, e.g., the purpose and intended use of the plan, the delegation of duties and prerogatives, the role of planning in the context of other program components. Also through monitoring and implementation evaluation requirements.	Bollens (1992); Burby and Dalton (1994); Berke and French (1994); Kaiser, Godschalk and Chapin (1995); Berke et al. (1999).
2. State administrative policy and oversight efforts.	As a function of the emphasis placed by state administrators on local efforts with regard to the substance of the plan's content and the planning process used, given practical and political realities.	Deyle and Smith (1998).
3. State capacity building and public education efforts.	Through the provision of funds and technical assistance for local planning efforts, and through education and outreach efforts for both the general public and local officials.	Burby and Dalton (1994); Berke and French (1994); Berke et al. (1999).
4. The local situation.	In particular, through political activism (where different interest groups promote competing outcomes), development pressure (where heightened pressure generally heightens local planning efforts), and the availability of developable land in non-sensitive areas (where limited availability generally dampens local planning and/or growth restriction efforts).	Burby and Dalton (1994).
5. Local capacity to plan.	As a function of local wealth and local planning/administrative capacity.	Burby and Dalton (1994).
6. Local commitment to planning.	Through local planning efforts and local land use analysis and decision-making processes.	Burby and Dalton (1994).
7. Local plan quality (as a factor affecting plan implementation).	Through local decision-making on development management program efforts (where higher quality plans tend to result in more balanced development management programs).	Burby and Dalton (1994).

* *Unless otherwise noted, the factor identified tends to operate to increase the locality's planning efforts and/or the quality of those efforts (e.g., both increased clarity of the state's planning mandate and increased local commitment to planning tend to increase plan quality).*

largely as a local function, a public decision-making process designed to help a locality more systematically and thoughtfully direct its own destiny. Typically authorized by state law under general enabling legislation for the purpose of promoting the public welfare, local planning is initiated by the locality itself for the primary purpose of clarifying and achieving local goals.

The second thread of work on implementation in the planning literature has focused on the issue of state-mandated local planning, looking in particular at efforts to implement state planning mandates for the purpose of natural hazards mitigation. This line of academic work has developed largely in response to the increasing use of state-mandated growth management programs, which have appeared since the early 1970s and have become increasingly sophisticated over time (Bollens 1992), as well as state coastal management programs developed in association with the federal Coastal Zone Management Act (Lowry 1985). These state-mandated programs in general have been designed expressly to prompt (or in some instances compel) localities to adopt policies or laws that constrain land use activities that are locally beneficial but that degrade regionally-important natural resources—what Bollens refers to as "growth restriction"[15] —or to adopt ordinances or policies that allow for the development of regionally important but locally undesirable facilities (e.g., landfills)—what Bollens refers to as "growth accommodation" (1992:455-56). They also tend to combine a mix of restrictive or coercive requirements with collaborative or cooperative requirements (see, e.g., May and Burby 1996; Berke et al.1999). Local planning undertaken in response to these kinds of state-mandated growth or coastal management programs is still a local function, but it is driven primarily by the state (and sometimes funded largely by the state as well), and so must internalize both local *and* regional or state goals. Moreover, given this purpose and the institutional structure involved, local plans are subject to some legitimate amount of state oversight, both in terms of the process used by the localities in preparing the plans and the substantive content and quality of the plans produced.

Given this state-mandated planning framework, the key plan quality and implementation questions are the very same ones discussed above, but with an added layer of complexity placed on top. One must ask not only what makes for a "good" local plan and how to characterize and measure implementation success, but now those questions must necessarily speak to whether and in what ways the local plan and plan implementation efforts have successfully incorporated the state's growth management goals. In addition to the procedural questions of whether the appropriate steps were taken and the appropriate people were involved, one must ask also whether the state's procedural mandates were followed. Moreover, in addition to asking the substantive question of whether the plan's policies were reasonably designed to achieve its stated goals, one must ask also whether those stated goals adequately internalized the *state's* goals and whether the adopted plan policies were reasonably designed to achieve those goals.[16]

And evaluating whether the overall state-mandated local planning effort has been successful, in turn, now involves thinking carefully about what the state's local planning mandate itself requires both substantively and procedurally, on top of the already-difficult task of assessing how good the locality's planning effort was (in terms of the process used and the substantive content and quality of the plan produced) and whether and in what ways the locality actually used the plan. This new evaluative task is more difficult not only because of the additional steps involved, moving from state mandates to local plan making to local plan implementation, but also because it adds a new dimension of state-and-local intergovernmental relations not present in locally-initiated (or non-state-mandated) land use planning processes.

Finally, given the important distinction between locally-initiated land use planning and state-mandated local land use planning, the next question becomes: What can the state do to facilitate a successful state-mandated local planning program—one that yields high quality local land use plans and successful plan

implementation. Here the academic literature points to the importance of mandates, message, capacity, and commitment. That is, determining what a state can do to facilitate good state-mandated local land use planning requires thinking first about what exactly the planning mandates require, what message the state sends as it administers those mandates, and how much capacity the localities have to carry out the mandates. Perhaps most importantly, the state needs to pay particular attention to the level of commitment localities have toward both crafting land use plans that meet *state and local* goals and then following through in implementing those plans. Building local commitment, in turn, speaks back to local acceptance of the legitimacy of the state's planning mandates, local response to the state's administrative message, and local willingness to commit its available capacity to the planning task. And finally with regard to commitment building, the concept of message is particularly important in several ways. First, it speaks to the message the state sends in terms of which mandates are most important and what will constitute acceptable compliance with those mandates. Second, it speaks to the message the state sends through its outreach, education, and technical assistance efforts to justify why its regional growth management goals are worth striving for.

Back to Planning in Coastal North Carolina

This synthesis of the academic literature helps to lay out in a more general sense what makes for a good plan, what constitutes plan implementation success, and what the state can do to make both happen. How does this help to inform the current debates over local land use planning under CAMA? As described in some detail above, local planning under CAMA is part of a larger, state-mandated coastal area management program. As such, it has some of the state growth management program attributes described by Bollens (1992), with both a growth restricting component and a growth accommodating component, although in this case growth accommodation generally takes form as the "orderly development" of the coast's natural resources rather than the accommodation of locally unwanted but regionally important facilities.[17] The entire CAMA program also employs a complex mixture of coercive and collaborative requirements, primarily through the AEC regulatory permitting program and the planning program, respectively, although both programs have both coercive and collaborative attributes.[18]

More importantly, like state-mandated growth management programs in general, the CAMA land use planning program by design must factor in state goals, including goals pertaining to the protection and preservation of coastal resources.[19] This aspect of the program is all the more important given the increasingly recognized need to better address the problems of cumulative and secondary impacts on coastal resources, and especially given the Coastal Futures Committee's emphasis on improving local planning and local plan implementation for the purpose of improving coastal resource protection efforts overall. Thus, when thinking about the local land use planning program under CAMA, it is not enough to think only about whether local CAMA plans help to advance community goals. That is, in addition to thinking about how well and in what ways the plans serve to meet local needs, it is also necessary to think about whether and how they help to advance the state's coastal resource management goals. Moreover, it is important to do so, first, both in terms of local compliance with the state's procedural planning requirements and in terms of substantive goal achievement, and second, both with regard to the quality and content of the plans produced by the localities and with regard to the ways in which they use their plans.

At the same time, CAMA land use planning is unique and defies easy, generalized policy prescriptions. North Carolina has a long history of giving great deference to local government autonomy, as evidenced in particular by the structure of the CAMA land use planning program as ultimately adopted (see Heath 1974), as well as the CRC's long-ago adopted administrative policy of focusing on the procedural aspects of the land use planning guidelines and leaving substantive plan policy decisions largely to local government (see Owens

1985; Heath and Owens 1994). Moreover, there has been some debate about how the planning program should fit together with the AEC permitting program (i.e., whether, for example, coastal water quality should be addressed through the AEC program alone or through local plans as well and, if so, to what extent and in what ways); how much and what kinds of flexibility should be given to localities in preparing their plans; how prescriptive those plans should be in directing local land use decision making (i.e., blueprint, vision statement, or something in between); how much local governments can be expected to do through their planning and plan implementation efforts given staff and resource constraints; to what extent local governments should be expected to go beyond state coastal resource protection requirements, if at all; and, more generally, to what extent the local planning program should be viewed as solely a local prerogative or should incorporate state management objectives.

All of these issues are thorny, inseparable, and contestable. And to the extent that different members of the coastal community would give fundamentally opposed prescriptions for addressing them, it should be no surprise that there is contentious disagreement on whether local planning is working (or perhaps agreement that it is not working but disagreement as to why) and what should be done to change it. Nonetheless, the question remains: What does it mean to implement a local CAMA land use plan anyway? Or more to the point, the question should be phrased: What makes for the *successful* implementation of a local CAMA land use plan? The short and simple answer is that it depends; it depends on what we expect to get out of the local planning program, how we design the process, and whether the local plans produced (and the way they are implemented) meet our expectations. Short and simple answers often are not all that helpful. The long and hard answer is that reaching agreement on what makes for success necessitates reaching some level of workable agreement on the appropriate answers to a number of more difficult and interrelated questions. Drawing from the discussion presented above, these issues include at the very least:

- What the purpose of the CAMA plan should be in the first place (i.e., whether, where, and in what ways the plan should be growth restricting, growth accommodating, or both; how much and in what ways the plan should advance the state's coastal management goals as well as local goals);
- How the CAMA plan should be used (i.e., whether the plan should function as a blueprint, vision statement, or something in between[20]);
- What makes for a high quality CAMA plan (e.g., looking as the plan's factual base, clarity of goals, and the prescriptiveness and appropriateness of the policies adopted, as well as its spatial specificity, various forms of consistency, and monitoring and evaluation procedures);
- Whether the process used in preparing a given CAMA plan was appropriate (e.g., followed the right steps, included the right people, employed appropriate analyses, provided the proper disclosure regarding the policy choices made and their implications); and
- Whether the substantive content of a given CAMA plan was appropriate (e.g., adopted policies that were both consistent with the goals of the plan, given its purpose and intended use, and reasonably designed to advance those goals; included a meaningful and reasonable development management program; included a meaningful monitoring and evaluation component).

To make matters all the more challenging, all of these issues need be resolved in the context of North Carolina's contentious coastal management history and institutional setting, as touched upon briefly above.

Moreover, having answered these questions, characterizing planning program success further requires agreement on the question of how to characterize what makes for successful *use* of the plans once produced. Answering this question, in turn, requires thinking back to the purpose and

intended use of the plan—where measuring the outputs of a blueprint means something different from measuring the outputs of a vision statement—and thinking about how outputs themselves should be measured (e.g., against what the plan proposed, what might have happened had there been no plan, or what might have happened had the plan been better). It also requires thinking about whether success is achieved simply if a plan's policies are implemented procedurally (e.g., a called-for zoning ordinance was adopted), or if it is also necessary to show some tangible evidence that the plan's substantive goals (e.g., improved coastal water quality) have been achieved. Sometimes long and hard answers, although perhaps more helpful, can be daunting.

In summary, these are complicated questions speaking to a host of complicated coastal management and land use planning issues. The CRC's Planning Review Team has been struggling with all of these issues and questions in one form or another, as well as the more difficult questions revolving around how to restructure the CAMA planning guidelines in a way that will most likely yield high quality plans and implementation success. Once their task is done, the larger coastal community will have to come to terms with and reach some kind of workable consensus on all of these same issues as well. Being thoughtful about the technical planning processes to be employed will be vitally important, but by itself will not be sufficient. Rather, resolving the CAMA land use planning controversy will come only when the state and coastal community together can reach a workable consensus on several key substantive issues as well, including: (1) what purpose the local CAMA planning program should serve—particularly in relation to the state's other coastal resource protection efforts; (2) how that program would be most effectively and most appropriately structured given all the things that make for good planning and good plan implementation in the context of all the factors that make North Carolina unique; and (3) what we can hope to achieve through the use of the plans produced from the process. No one should think that this task will be easy, but the potential rewards of moving the planning program forward as a meaningful and valuable part of the coastal management program make it worth forging ahead. CP

Notes

[1] The characterization of the differing positions presented above draws largely from direct observation of the Planning Review Team's efforts, along with extended telephone and in-person interviews of state and local officials, interest groups representatives, and private citizens from across the coastal region.

[2] The act is codified at N.C. General Statutes 113A-100 et seq.

[3] The CAMA program was formally approved by the federal Office of Coastal Zone Management as being in compliance with the Coastal Zone Management Act (16 U.S.C. Section 1451 et seq.) in 1978 (US DOC 1978). This approval had the effect, among other things, of making the state eligible to receive federal grants-in-aid from the National Oceanic and Atmospheric Administration (NOAA).

[4] See N.C. General Statutes 113A-104 et seq. The CRC, among other things, establishes policies and objectives for the coastal area, promulgates administrative rules or "guidelines" for carrying out the act, certifies local land use plans, and designates areas of environmental concern. DCM, a division within the N.C. Department of Natural Resources, supplies administrative support to the CRC by, among other things, providing staff support for its proceedings and conducting the day-to-day administration of the planning and AEC regulatory permitting programs. In addition, the Director of DCM serves as the Executive Secretary to the CRC.

[5] This percentage was recently increased to roughly seven percent with the CRC's promulgation of its new coastal shoreline AEC rules (see N.C. Administrative Code 7H.201 et seq.). It is worth noting that this expansion of the AECs was quite controversial itself, coming on the heels of a more ambitious proposal that was retracted and amended in line with the recommendations of a stakeholder advisory group convened in response to that controversy. For a discussion of this rulemaking effort, see: http://dcm2.enr.state.nc.us/Current%20Issues/current_mainpage.htm (August 10, 2000).

[6] The North Carolina Coastal Management Program and Final Environmental Impact Statement (US DOC 1978), written in order to satisfy federal standards for approval of North Carolina's Coastal

Management Program under the Coastal Zone Management Act, provides a contemporary interpretation of how the coastal management program was intended to operate. This document speaks to the relationship between state policies, standards, regulatory permitting, and local land use planning throughout. It speaks most directly to the issue of the role of *local planning* efforts in furthering the goals of the act–that is, beyond the AEC permitting program–in what it refers to as "The Second Tier – Management Outside of AECs" (US DOC 1978:202-23). This discussion clearly contemplates a heavy reliance on various state resource management programs other than CAMA itself to ensure adequate management of activities taking place within CAMA local land use planning areas but outside of designated AECs. At same time, however, the program clearly establishes that local plans are to be prepared in accordance with state planning guidelines that are, in turn, clearly to be crafted so as to advance the larger goals of the act, including most prominently the "protection, preservation, and conservation of natural resources," (see N.C. General Statutes 113A-102(b)(4)(i)), suggesting that reliance on other state programs alone for coastal resource protection outside of AECs was not intended.

[7] For more discussion regarding the Coastal Futures Committee's recommendations and efforts to implement those recommendations, see Godschalk (2000a).

[8] This text was taken from the DCM web page describing the efforts of the CRC's Planning Review Team, at: http://dcm2.enr.state.nc.us/Land%20Use%20Planning/lup_mainpage.htm (August 10, 2000).

[9] Two recent assessments of the CAMA land use planning program are provided by Hinkley and Kaiser (1999) and Godschalk (2000b).

[10] At the extreme, if the purpose of planning is to serve solely or even primarily as an awareness-raising process, then implementation might somewhat tautologically be deemed "successful" simply if, at a minimum, the plan itself was produced (see Talen 1996:250-51).

[11] See generally Burby et al. (1993); May (1993); Berke and French (1994); Dalton and Burby (1994); Burby and Dalton (1994); Burby and May (1997).

[12] It should be noted that much of this work has addressed as a primary question the extent to which the use of a state planning mandate affects the quality of planning efforts. Thus, the thrust of much of this work has focused on the question of how well localities have complied with a state's planning mandates in developing their plans–that is, looking at the implementation of the state *planning* mandates in terms of local plan making efforts–rather than at the question of how well the localities have actually implemented the plans produced (see, e.g., May 1993).

[13] The term "policy-related" factors is used here to distinguish between variables that are under the control of a state or local government more so than "setting-related" variables, such as community location or wealth.

[14] In a nutshell, Burby et al. (1993:4), studying state-planning mandates designed to address the mitigation of natural hazards, found that "the most effective mandates are those that are comprehensive in what they require of local governments, have strong sanctions for noncompliance with mandate provisions, and build local planning capacity and commitment through grants-in-aid and technical assistance."

[15] Natural hazards mitigation fits here too, not as an activity that causes the degradation of a natural resource, although such may occur, but primarily as a locally-beneficial land use development pattern that can yield substantial state or national costs in the way of demands for post-disaster relief and assistance.

[16] Of course, in asking whether a local plan adequately internalizes and advances the state's goals, it is also necessary to consider whether the state's planning mandate itself clearly articulates those goals and the state's expectations regarding local efforts to advance them.

[17] In the context of coastal development in North Carolina in particular, "growth accommodation" takes shape as a concern for having adequate facilities (e.g., water, wastewater, roadways) in place to accommodate locally and regionally desirable economic development, especially with regard to tourist-based development along coastal waterfronts and job-generating commercial and industrial development inland.

[18] For example, the AEC permitting program distinguishes between larger projects that might engender greater environmental impacts, reserving the permitting decisions for those projects to the state, while permitting decisions for smaller projects can be delegated to the localities (15 N.C. Administrative Code 7H). Similarly, local CAMA plans must comply with fairly extensive administrative rules or "guidelines" promulgated by the state, which as currently written and administered are fairly prescriptive procedurally but which leave substantive policy decisions primarily to

the local governments (Owens 1985; see 15 N.C. Administrative Code 7B).

[19] See N.C. General Statutes 113A-110(a).

[20] One issue that has been raised repeatedly pertains to the idea that a local land use plan is not the same thing as a zoning ordinance–and should not contain the detail or specificity normally found in a zoning ordinance–but rather the policy-making document used to determine whether a zoning ordinance or some other local government land management tool is needed and, if so, what it would be designed to do. It may be the case, however, that a land use plan map and associated policies pertaining to areas that are particularly important socially or particularly sensitive environmentally should contain detail more like that of a zoning ordinance. In his discussion of the history behind CAMA's enactment, Heath (1974:373) concluded that it was "difficult to predict the shape and content of the plans to be developed under the Act" since there was no settled body of planning concepts, no clear legislative history, and no clear or consistent philosophy or policy in the act itself to settle the question. He further noted in a footnote (id. at 373, note 83), however, that: "Viewing the Act as a land use lawyer, Professor Philip Green believes that the plans called for by the Act, at least for designated areas of environmental concern, should be more like the typical zoning ordinance than the typical city or county plan. This interpretation would fit easily with the consistency requirements of the Act, but it remains to be seen whether any of the planning units will actually share this view."

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A Local Government Perspective on Land Use Planning

Joan P. Altman

Rapid growth in coastal North Carolina poses tremendous challenges for local governments. Even though we are growing quickly we are still in general small, rural and often economically disadvantaged communities. As people move to the coast to enjoy a lifestyle that often includes golf and water access, they are migrating to communities that have insufficient infrastructure to support increasing numbers and additional demands for higher-level government services. Even with the influx of new residents, our tax bases are not large, our regional population remains politically insignificant and many government services taken for granted in larger communities remain unaffordable.

Many communities in coastal North Carolina are struggling with the challenge of absorbing the newcomers. Local governments are confronted with the reality of increasing restrictions from other levels of government on development of necessary infrastructure. We desperately need roads, sewer, water, landfills, and diversified economies to responsibly provide services to the people who are here and to accommodate the people we know are coming.

This growth is viewed as a "bad" thing by some who fear that the unique environment of coastal North Carolina will be destroyed by people coming here to enjoy it. To others who have waited years for economic prosperity, this growth is a "good" thing that will finally bring coastal North Carolina into the twentieth, much less twenty-first, century. Complicating these perceptions about coastal North Carolina are the towns and counties that are not experiencing growth, many who are among the poorest in the state. Coastal North Carolina is very diverse, and that diversity makes generalizations about coastal issues very dangerous.

Conflicts between those who view growth as good or bad are most intense at the local government level where land use and zoning decisions are made. Local governments must cope with various factions, interest groups and citizens whose opinions are often opposite and who vow to go to any length to see their views prevail. A commonly heard remark is that we need "more, or better, planning" to deal with the growth. Some look to "planning" to slow or stop growth while others look to "planning" to provide infrastructure to encourage growth. Using "planning" to attempt to reconcile divergent views about community growth is one of the biggest challenges for any local government.

It is appropriate that the level of government closest to and most directly responsible to the citizens makes zoning and land use decisions. It is ironic to hear people at other levels of government question the ability of local government to make these decisions. In the end, it is our citizens, through their involvement in various boards and public hearings and meetings, who make the zoning and land use decisions, and it is our citizens who pay the local taxes which fund the programs and personnel mandated by regulations from the state and federal governments. Attempts to require additional

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state or federal involvement in mandatory "planning" is one of the biggest fears of local government. These mandates often come with no funding and unrealistic perceptions about what the planning should accomplish and the ability of local government to implement yet another layer of "planning" requirements.

Years ago the state recognized the importance of planning and acknowledged that small communities often cannot adequately fund important planning functions. Grants and planning expertise are available to local communities through the Department of Commerce Division of Community Assistance. In addition, many Councils of Government provide planning services to local government on a contract basis. Many coastal communities were first introduced to planning with the enactment of the Coastal Area Management Act (CAMA), which mandates the preparation of land use plans in all 20 coastal counties and allows municipalities to adopt their own land use plans.

CAMA land use plans are prepared by local governments and funded in part by grants from the Division of Coastal Management. Content of the plan is defined in state regulations. The plans are reviewed by the Division of Coastal Management staff and then referred to the Coastal Resources Commission, a politically appointed board, for approval. Local governments use these plans for policy guidance, and state and federal governments use them for reviews during various permitting processes to ensure that permits are consistent with the locally adopted policies.

The land use planning requirement is part of the same state act that created the Division of Coastal Management and authorized the creation of various regulations regarding the use of coastal resources. Many of the state government functions authorized by the act directly impact local governments and even infringe on local government autonomy. To ease local governments' concerns about these issues, the act envisioned a partnership between the state and local governments. In the case of land use planning, it is clear that planning policy decisions are to be made locally. The state is to provide information to help develop the plans, and the state review process is to assure compliance with state and federal regulations. Recent controversies regarding land use planning have centered on whether the Division of Coastal Management staff or the Coastal Resources Commission should be involved in changing the policies developed at the local level.

The plans reflect the diverse needs of individual coastal communities and are most useful when they are truly local documents encompassing the policies determined important by the citizens during the plan development process.

The land use plans and their development have become increasingly controversial as rapid growth has come to coastal North Carolina. Citizens whose views on policies did not prevail at the local level ask the Coastal Resources Commission to disapprove or change land use plans. Local governments contend that plans developed in accordance with the regulations should be approved and that policy debate was concluded at the local level. Division of Coastal Management or Coastal Resources Commission intervention in local policy during the approval process is a direct assault on local government autonomy and a violation of the partnership defined by the CAMA. Worse, it is an indication of a lack of trust for the professionalism of local government employees and contracted planners and the motives of elected officials.

These concerns go to the very heart of whether planning should be a local or higher level government function, how much involvement outside interests should have and

whether plans should be subject to some sort of enforcement from a higher level. Citizens frustrated by rapid growth and the environmental changes it brings are looking for ways to "make" local governments solve the problems caused by growth. For them the land use planning process is a weapon to be used by higher levels of government to force what they see as irresponsible local governments to change the way they do business.

The reality is that CAMA land use plans provide a wealth of information on population and economic trends, land and water uses and natural resources. They are tools to provide guidance for decisions regarding land use regulations, issuance of permits and plans for public facilities and services. The plans themselves are not regulatory but rather are a reference to be used in the development of regulations. They reflect the diverse needs of individual coastal communities and are most useful when they are truly local documents encompassing the policies determined important by the citizens during the plan development process.

Questions about the utility and implementation of land use plans have moved the Coastal Resources Commission to initiate a review of the land use planning process and requirements. This review is important and will undoubtedly yield many improvements, but it is unlikely to resolve some of the most basic concerns about the local-state partnership in development of coastal regulations and citizen questions about the direction of growth management. CP

The Disconnect Between CAMA, CRC, Local Governments, and the Protection of North Carolina's Coastal Waters

Richard H. Bierly

The North Carolina Coastal Area Management Act (CAMA) requires coastal counties to prepare land use plans every five years as a means of protecting the health of our coastal environment while guiding economic development. A primary role of the Coastal Resources Commission (CRC) is to assist local governments in understanding the requirements for these plans and to approve them when submitted. Some members of the Coastal Resources Advisory Council (CRAC) also participate in this review process. To offset the expense of this planning effort, the Division of Coastal Management (DCM) awards grants of up to $500,000 annually. The beauty of the concept is that it allows local governments to set their own priorities, identify local problems and challenges and to take steps to cope with them as they guide economic growth in their jurisdictions.

Yet, by any objective measure, water quality in the coastal waters is declining. Shellfish waters, our "canary in the mine," continue to experience closings, both temporary and permanent. Fish kills persist and important sea grass beds continue to shrink. The causes vary by region but are well understood. Studies of tidal waters have found a strong correlation between declining water quality and increased development. The increase in impervious surface coverage and development densities in river basins can be linked to this decline. These are precisely the issues local land use planning was intended to address.

In September 1998, the CRC declared a moratorium on land use planning in coastal counties; this move was motivated partly by expressions of concern by environmental groups. The CRC then formed a task force in early 1999 to revise the requirements and to improve the planning and approval process. This task force is still at work, but unfortunately, the CRC will face serious challenges in implementing its recommendations if they are seen as more "intrusive" in local affairs.

What is the problem? What was intended to be a cooperative effort between local governments and state officials has turned into a process that is bureaucratic, complex yet superficial, and consultant-driven. If one reads the regulations, it is clear that the land use plans were meant to be prepared by the counties with coordination among local governments. However, many local planning boards hire consultants to prepare the plan, with one firm often providing services to multiple communities. Furthermore, 20 county plans were originally envisioned but 90 local and county plans currently exist. To further complicate this situation, there is little or no effort to verify that policy statements and other actions within a county actually complement each other. An extensive bureaucracy has emerged which perpetuates the process without any culpability for the degradation of coastal waters.

Why has this process failed? One reason is the lack of quality public participation. The CAMA regulations require that "[l]ocal

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governments shall employ a variety of educational efforts and participation techniques to assure all segments of the community have a full and adequate opportunity to participate in all stages of plan development." In my personal experience, however, this simply is not done. In my county, for instance, news notices were placed announcing the public meeting, which drew approximately six people. At this meeting, public input was neither requested nor welcomed, and any input provided was rejected out of hand with no feedback. The DCM did nothing to see that a "Citizen Participation Plan" was developed! From my observations at CRC meetings and discussions with other citizens, similar experiences have occurred in other counties.

Another major reason is the approval process for the plans themselves. The review process is a cursory one which focuses on administrative requirements rather than substance. Elected and appointed officials have learned to make their plans as flexible as possible and the CRC has supported this trend through its interpretation of the regulations. For example, the regulations call for a comprehensive analysis of specific issues such as wastewater management, water conservation and drinking water supply. These elements of the plan are then to be reviewed by the appropriate state department. Instead, local plans often restate North Carolina regulations, despite localized problems that need attention. Many of the aquifers supplying our communities are severely dewatered and other communities have serious wastewater treatment problems, but I have never heard these issues raised in a CRAC or CRC meeting! Shellfish waters continue to be closed or opened conditionally due to stormwater runoff; in many cases, this represents a violation of the requirements of the Clean Water Act. Yet, I have never heard a member of the Division of Environmental Health's Shellfish Sanitation Section or the Division of Water Quality speak out in opposition to a land use plan! Since it is clear these state departments do not view land use planning as a useful tool in meeting their mission, why are they even involved in the process?

The CRC justifies its cursory examination procedure by pointing out they cannot require implementation of action plans. The commission and the CRAC members who participate in the review process appear to approve plans knowing they will be ineffective, simply because they are not in a position to point out any specific legal requirements not being met. Others seem to want to avoid making waves, provided the DCM staff says the plan in question complies with the regulations.

Commission members should read their own rules. They clearly require a lot more than is currently being done to involve the community in the planning process. The rules also call for plans of substance, not boilerplate. Why the CRC is so reluctant to make use of this valuable tool speaks volumes as to the level of commitment to real coastal protection that now exists in our state. But in all fairness, the CRC cannot do it alone. If the Division of Coastal Management staff continues to treat this effort as an administrative drill, then matters of substance will never be discussed.

Many local officials freely disparage the land use planning process as a paper drill into which they put as little effort as possible. It appears they feel the state government should not interfere with local responsibility, and yet many seem not to want to create and implement provisions protecting their environment if they seem to "complicate or inhibit" economic growth. But isn't that the idea in the first place, finding a way to "protect the coast and grow sensibly?"

This debate seems to be about power and politics, not about science. It is about freedom at the local level. CAMA/DCM requirements are viewed as obstacles to overcome. Local officials argue they are protecting "private property rights" and fail to consider protecting "public trust waters," as they see the former being their responsibility and the latter, DCM's. A careful reading of CAMA does not support that interpretation.

Quite appropriately, economic growth and development are paramount to local officials. However, they risk "killing the golden goose" if they do not control this development to ensure that it does not continue to ruin the environment that is the foundation of the way of life at the

coast. Local officials who reject out of hand proposed CRC action frequently argue that an economic analysis has not been performed. However, these officials should be willing to perform detailed analyses of the cumulative and secondary impacts of decisions they make regarding the future of their jurisdiction—and this analysis can begin with a good land use plan.

What can be done to improve this situation? Three important action steps are needed. First, the public needs to become better informed and more involved. They should find a way to let their elected officials know they expect them to look at the long-term challenges facing their communities and take steps to protect the coastal environment. Second, local officials should pay more attention to the work of CRC/DCM. They should attend their regular meetings, appoint and properly charge citizens to CRAC slots and expect regular briefings on actions and events. Third, local officials need to be educated on the basic science of environmental issues. They need to understand cause and effect at the regional and local levels so that they can propose sensible and relevant safeguards for their communities. These by-invitation-only sessions could be developed and conducted by DCM staff.

The goals of CAMA cannot be met by minor alterations to land use planning requirements. Land use plans could and should be an integral part of North Carolina environmental law. However, past attempts to integrate the two have failed, since by all objective state measurements, water quality continues to decline in the coastal counties. The CRC needs to raise the bar and make it clear that they expect the local governments to do better. If not, then the money dedicated to this program should be redirected to other, more useful environmental initiatives. CP

The Trouble With Storms

Todd Miller and Jim Stephenson

As Hurricane Floyd buffeted the Bahamas on September 13, 1999, many North Carolinians were quietly wishing that the storm would head due west. But it didn't. After brushing by Florida, Georgia and South Carolina, Floyd came ashore near Wilmington, North Carolina, on September 15.

Eastern North Carolina was still soaked from a week long encounter with Hurricane Dennis that lingered off Cape Hatteras for days before making a return visit to the mainland at Cedar Island. By the time Hurricane Floyd rushed through the state, the rivers were already swollen and the soils saturated. There was nowhere for Floyd's waters to go.

Hurricane Floyd has been tagged the worst disaster in North Carolina history. Whole towns were inundated by flood waters carrying everything from gasoline and oil slicks to hog carcasses and caskets downstream. Rainwater that collected in the floodplains of the Tar, Neuse, and Roanoke rivers displaced, and in some places destroyed, the communities and industries in these fragile areas.

Along the coast, the barrier islands protected the mainland from Hurricane Floyd's wrath. Oak Island had the greatest structural damage from Floyd, with 50 homes and vacation properties destroyed or substantially damaged. Erosion on Core Banks, including Emerald Isle, Pine Knoll Shores and Atlantic Beach, caused the beach to migrate from 15 feet to 50 feet landward. On Emerald Isle, 157 homes are now imminently threatened. On Topsail, Surf City and North Topsail Islands, oceanfront dunes and berms built in the aftermath of Fran were washed away.

Flooded With Problems

As a result of Hurricanes Dennis and Floyd, pollutants from flooded wastewater treatment plants, inundated septic systems, engulfed hog lagoons, underwater junk yards, drifting propane and oil tanks, and chemicals leaching from flooded garages and industrial facilities were flushed into rivers, streams, and sounds. This polluted toxic soup was transported downstream where it was deposited into the estuaries of the Albemarle and Pamlico Sounds.

As the pollutants moved downstream, dissolved oxygen in the Pamlico and Neuse Rivers and Pamlico Sound dropped, and in some places became depleted. Han Paerl, a marine scientist at the University of North Carolina's marine lab, believes that fish probably fled the estuaries after Hurricane Dennis. One member of the North Carolina Coastal Resources Commission claims to have caught a catfish in the ocean shortly after Floyd.

Water quality deteriorated so dramatically during the storms that State Health Director Dennis McBride issued an advisory for people to

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avoid contact with the water. People were advised to avoid contact that would expose eyes, ears, nose, mouth and any cuts or sores to floodwaters. Out on barrier islands, the surge combined with the rain to flood inland areas. Island towns pumped the stormwater into the ocean, contributing to water quality degradation that in one case caused six surfers to become ill after swimming off of Emerald Isle.

Dollars & Sense

When Hurricane Fran hit the North Carolina coast in September 1996, political officials claimed that they had learned some lessons. FEMA Director James Lee Witt told *The Raleigh News & Observer* that "If we're going to keep people out of harm's way and if we're going to cut costs from disasters, we're going to have to change the way we do business." The recovery from Hurricane Fran racked up a bill of $6 billion, including $211 million in FEMA public assistance grants and loans.

Among the expenditures after Fran was $4.6 million to erect a 4-foot high bank of sand extending 15 miles along the beach at Topsail Island. Those sand dunes were virtually wiped out during Floyd leaving wooden walkways arching over the now flattened beach. Federal money also went toward rebuilding beach houses, fishing piers and a high-rise hotel, further promoting development in vulnerable areas.

"Bad management decisions in 1996 will haunt us for generations to come," predicted Kevin Moody, a resource biologist with the U.S. Fish and Wildlife Service, which has responsibility for protecting the nests of endangered sea turtles. Moody spent several days surveying the damage on barrier islands following Hurricane Floyd. Moody surmised "I didn't see any damage that was purely because of Floyd. It was all because we decided not to take the appropriate action in 1996."

Since 1968, when the Federal Flood Insurance Program began, through 1997, FEMA estimates that one-third of the $8 billion in flood insurance payments went to property owners experiencing repeated losses. Now that entire towns have been devastated, the question is: How will these communities rebuild and where?

In an attempt to avoid repeating past mistakes, environmental organizations developed a set of principles for disaster relief which were sent to North Carolina's Congressional Delegation, Governor Hunt and state legislative leaders. The principles call for removing wastewater treatment plants, intensive livestock operations and junkyards from floodplains. Public funds should be used to relocate homes and businesses away from flood-prone areas. Instead of paying for the reconstruction of homes in high-risk portions of barrier islands, public funds should be used to acquire areas unsuitable for development (see Fig. 1).

Sand Dollars

Tucked away in this year's budget passed by the NC General Assembly is an unfunded mandate for the Department of Environment and Natural Resources to prepare a plan by May 1, 2001, to determine how to fund beach restoration projects in North Carolina.

Pressure to get the state more vested in these projects is coming from oceanfront towns and counties from the Outer Banks to Ocean Isle. Local governments are worried that along more than 160 miles of beach, the ocean may soon undermine homes, rental properties, hotels and condos, as well as the streets, highways and other utilities that service these seaside resorts. Mounting damages include eroding property values and declining incomes from rental properties and the tourism economy.

North Carolina knew decades ago that this "day of reckoning" for oceanfront properties was on the way. That is why it adopted formal regulatory policies for how best to respond to continuing and predictable shoreline migration. Land use planning, construction setbacks, building relocation, subdivision rules, management of vegetation, and pumping sand on beaches are preferred responses to erosion–so assert these state policies.

Based upon these regulatory principles, projects designed to respond to erosion should avoid losses to natural heritage and not adversely affect the productivity of our coastal and ocean waters. The public trust right to use the ocean beaches, including traditional recreational uses

such as walking, swimming, surf-fishing and commercial fishing, are to be preserved.

It is predictable that oceanfront communities would lobby for help in paying to put more sand on their beaches. For a while such projects can reduce property losses, and they hold out some hope for maintaining the "status quo," or even allowing more intense oceanfront development. But sea level is now rising at a projected rate of 1.7 feet per century, hurricanes and northeasters are now predicted to occur more frequently and at greater intensity, and there are chronic shortages of economical sources of sand along significant portions of our coast. All this means that the on going costs of drawing a line in the sand and attempting to hold the beaches where they are today will escalate until it is not technologically or economically feasible to do so.

Estimates of the average yearly cost of beach renourishment vary widely. These yearly estimates range from $350,000 to more than $3 million a mile. Using the lowest estimate, it will cost in excess of $56 million a year to do all the beach pumping now being sought by towns, counties and state agencies in North Carolina.

Most lawmakers and taxpayers resist such expenditures, especially those that are not financially connected to oceanfront property. There is little chance that the vast majority of taxpayers would willingly foot the bill for all the projects now being sought.

Future Shocks

The prognosis for weather patterns does not bode well for North Carolina's coastal region. In May, the US Department of Commerce's National Hurricane Center predicted that the 2000 hurricane season would be above average. This typically means 11 or more tropical storms, of which seven or more become hurricanes, with three or more classified as major. A major hurricane is classified as a Category 3 storm with winds surpassing 110 miles per hour. In 1999, there were 12 named storms, with five striking

Figure 1. Principles to Guide Disaster Relief to Reduce Future Damage and Protect the Environment

Remove Sources of Pollution from the 100-year Floodplain

- Repair and relocate as necessary waste treatment facilities.
- Do not rebuild or replace anaerobic lagoons for concentrated animal production facilities, but provide flexibility and incentives to use some public assistance for innovative technologies.
- Do not build or replace hog factories and other concentrated animal operations in the 100-year floodplain, in wetlands, or in prior converted wetlands.
- Relocate major pollution sources from the floodplain.

Reduce Subsidies of Risk

- Relocate homes and businesses in extreme flood-prone areas.
- Restrict development in high-risk portions of barrier islands and beaches.

Enhance our Natural Defenses Against Disaster

- Expand floodplain and wetland restoration programs.
- Restore buffers to reduce flooding and protect water quality.

Improve Future Planning

- Reassess floodplain delineation to determine the accuracy of current planning assumptions.
- Require local preparation of floodplain management plans.
- Assess status of residential drinking water wells and coordinate funding to relocate substandard wells.
- Coordinate the multiple sources of state and federal relief and infrastructure funding (such as FEMA, flood insurance, Clean Water Bonds, and FSA Emergency Loans) to assure that wise planning principles are consistently observed.

These principles were developed and agreed to by nine statewide and regional environmental organizations, including NCCF.

the mainland United States. While no one can predict the future, in eras when similar atmospheric conditions have been present, "75 percent of the Atlantic hurricane seasons featured above-average activity," according to the National Hurricane Center. The major unknowns are exactly where along the Atlantic Coast the two or three predicted tropical storms will hit and how strong they will be when they do.

The aftermath of an above average hurricane season could become a day of reckoning for beach towns and communities near the coast. Stan Riggs, a coastal geologist at East Carolina University, conjectures that the Outer Banks of North Carolina could break up and migrate rapidly toward the mainland in the next 10 to 20 years. Riggs claims it could take 10 years under above average storm activity, twenty years under normal storm activity as the result of sea level rise, or in just one year if a single Category 5 storm hit.

A report released this year by The Heinz Center projects that one in four homes within 500 feet of a U.S. coastline will fall into the water within the next 60 years as the result of sea level rise and storm activity. The Heinz Center studies seven counties along the Atlantic seaboard, including Dare and Brunswick in North Carolina. The study determined that in Nags Head in Dare County, five rows of homes could be lost to beach erosion over 60 years. At Holden Beach in Brunswick County, two rows of homes have already been lost to erosion.

Holden Beach, North Carolina
North Carolina Division of Emergency Management

What is clear from these studies and prognostications is that singular solutions like beach renourishment will not be enough to trick Mother Nature. Beach renourishment may provide some protection under a low-storm scenario, but nourished beaches are ill-equipped to counter the devastation that could be caused by an above average hurricane season. A multi-faceted response to erosion that includes enforced construction setbacks, relocating buildings back from the sea, property buyout programs, stronger subdivision rules, management of vegetation and meaningful land use planning is our only hope in dealing with the storms that are looming large on the horizon.

Proposed Elements of a Beach Restoration Plan for North Carolina

The State should base its new beach restoration strategy on its existing oceanfront policies, which require a multi-faceted response to beach migration. The North Carolina Coastal Federation supports these policies, and advocates carrying them out by evaluating the acceptability of all beach renourishment proposals based upon the response to the following concerns:

There must be acceptable and adequate sources of sand available. There should be suitable and sufficient sand available within an economical pumping or hauling distance to keep beach nourishment a viable alternative for at least 30 years. We know that cheap sand (i.e., high-quality sand close to the beaches) is not in plentiful supply along much of the NC coast. Mud, mud balls, and shell debris should not be allowed on any beaches, as has occurred with renourishment projects at Atlantic Beach.

The project must be properly planned, timed and executed. Proper planning, timing and execution of projects is essential to minimize unacceptable impacts to fisheries and endangered species. The "window of opportunity" each year when dredging can occur is small (normally November through March). That window can get even smaller in years when temperatures are unseasonably warm. Regulatory agencies must strictly enforce permit conditions on projects, even if that means starting a project later than

planned or stopping the project before it has been completed.

Adequate habitat and water quality monitoring must occur to evaluate effects on fisheries and water quality. It must be demonstrated that the mining and placement of sand on beaches has no unacceptable effects on fisheries and water quality. The scale of existing beach renourishment projects is small compared to new projects now contemplated. Because there has been so little study of the biological effects of beach renourishment, all new projects that are undertaken should include monitoring to prevent unacceptable effects on recreational and commercial fishery habitat. This includes on-going monitoring of the use of potential "borrow sites" as fish habitat to determine when dredging should be allowed to begin and when it must end. At least five percent of the project budget should be spent on monitoring activities.

Project planners must be completely forthcoming about the long-term costs of renourishment. Nobody knows for sure how long a beach renourishment project will last. Storms will ultimately claim much, if not all, of the added sand, and long-term storm prediction is very uncertain. Based on past experience, most beach nourishment projects on the Atlantic coast last less than five years. Planned projects should delineate the range of possible project costs based upon worst and best case scenarios.

The project must provide adequate public parking. The beach access public parking standards adopted by the North Carolina Coastal Resources Commission establish the minimum amount of public parking that should be provided as part of any publicly funded beach renourishment project. Communities that do not have this amount of public parking must provide it to become eligible for projects that are financed with state or federal tax dollars.

The project must include an "exit strategy" to deal with beachfront property when renourishment is no longer feasible due to insufficient funds, sand supplies, and/or future storm activity. The Coastal Resources Commission and local governments should adopt and enforce a beachfront building setback from the ocean for new construction based upon a factor that would protect houses and properties for 100 years. Counties and municipalities should not be eligible for state and federal funding unless they have land use plans and ordinances that actively discourage development of structures on beachfront property that cannot readily be moved. All local units of government should adopt a public disclosure ordinance requiring that potential buyers be fully informed about the erosion history of oceanfront properties and the anticipated future costs of nourishment. Each prospective buyer should also be given a copy of *Questions and Answers on: Purchasing Coastal Real Estate in North Carolina.* This well-written pamphlet was prepared through the North Carolina Sea Grant Program and provides unbiased information about beach erosion.

The project must be financed so that it places the burden on the people that benefit from renourishment. Public financing for beach renourishment should place the burden of paying for projects on the people who most benefit from them. The most obvious beneficiaries include oceanfront property owners and their guests. Primary sources of funding include special property tax districts, oceanfront lots and occupancy taxes. There should be taxation with representation by bringing the issue to a vote via public referendum, thereby giving citizens the opportunity to decide. CP

Hazard Mitigation on North Carolina's Coastal Barrier Islands

Anna K. Schwab and Margaret J. Anders

Human beings are drawn to water. We have settled near oceans, rivers and lakes. We are attracted to water for its practicality, wealth and sanctuary. We have used the waters of our world to connect cultures, supply food and provide recreation. At the same time, the coastal regions that have so much to offer also have a hazardous side – a side that brings coastal storms with flooding, storm surge, high winds, and erosion. We cannot deny its hazardous nature, yet we continue to live in coastal regions.

North Carolina is blessed with a large and productive coastal region, one that encompasses 20 of our 100 counties. This region is precious and fragile, with dynamic geologic processes that make it a place in constant flux. Barrier islands migrate, dunes shift, beaches erode, and inlets are continuously in motion. These processes occur through the daily action of ocean waves, wind and currents; more dramatic changes can occur during a coastal storm or over the course of several storms. As scholars have noted, the only thing constant in the coastal region is the state of change.

Compounding the dynamic nature of our coastal region are well known and accepted theories that our earth is in the midst of a dramatic climate change that may contribute to the increased vulnerability of our coastline. Many scientists believe that global warming and other factors are resulting in an accelerated rise in sea level, which will in turn increase erosion and submerge lands along ocean shorelines.

In addition to contributing to a rise in sea level, climate changes may also cause more volatile weather systems, creating meteorological events that are more intense and frequent than ever before. In the Atlantic Ocean, a pattern of increasingly frequent, widespread and powerful coastal storms has been noted in the past few years. After nearly half a century of relative calm, North Carolina appears to be entering a cycle of more numerous hurricanes and other significant coastal storms.

North Carolina's Beach Economy

All of these issues have profound implications for barrier island communities. Tourism on the barrier islands is a significant part of the economy in North Carolina. Moreover, on the barrier islands, most of the economic activity is confined to a narrow strip of land that is very close to, if not fronting on, the ocean.

It is no wonder that tourism is playing an increasingly important role in North Carolina's economy. Residents of North Carolina are able to travel more because of a robust economy; there is

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more disposable income available for leisure and recreation than ever before. Going to the beach is a perennial favorite vacation, and the coast is at most only a day's drive from anywhere in the state. Additionally, North Carolina is a well-known destination for tourists from all over the country. While the Outer Banks were once inaccessible and unknown, seasonal visitors now pour into the coastal area from out of state. North Carolina is popular because the weather is temperate, the beach-going season is long, the water is clean, the sandy beaches are relatively pristine, and recreational opportunities abound.

Most North Carolina beach communities are experiencing phenomenal growth deriving from the popularity of the ocean as a tourist destination. Along much of the coast, development has changed from scattered single-family cottages to large hotels and resorts. While this growth means that our beach communities are economically active, it also means that more property and more people are in danger from natural hazards.

When the built environment intersects with natural hazards, it is the built environment that sustains damage: water damage, structural collapse, falling piers, blown-off roofs, washed out septic systems, demolished roads, power outages, and more. And it doesn't take much to cause a long-term shut down. One hurricane or violent storm can cripple a coastal community's economic base – its businesses, infrastructure and housing – for an extended time.

Nags Head, North Carolina
David Brower

Mitigating the Impact of Coastal Storms

The coastal region's long history of disastrous natural hazards, coupled with its economic importance within the state, should persuade us to consider means to make the area less vulnerable. Mitigation, by dictionary definition, means to make something less severe or painful. The Federal Emergency Management Agency defines mitigation as "any sustained action taken to reduce long-term risk to human life and property from natural hazards." Through mitigation, a coastal community can reduce the impact of natural hazards by building the community in a manner that gives it a better chance of withstanding the force of a natural hazard. Mitigation can create a resiliency that will help the local economy rebound more fully and quickly after a disaster.

Mitigation strategies can be divided into three general methods: (1) environmental intervention; (2) structural strengthening; and (3) non-structural methods. No one method can solve all of a community's hazard problems; rather, communities, through engaging in a mitigation planning process, can pick and choose a combination of techniques that will work best for them.

Mitigation Strategies

Environmental Intervention

The first category of mitigation strategies is called the environmental intervention method. It involves altering the environment in order to armor the community against disaster. In coastal areas, such practices include building dikes, seawalls, groins, and jetties. These mitigation techniques can be quite successful in lessening the impact of daily erosion and littoral-drift sand depletion, and can also provide some measure of protection against coastal storms. However, the benefit of these engineering structures is almost always short-term, and they frequently result in an exacerbation of risk to down-drift shorelines. Furthermore, by instilling in us a false sense of security that we can continue to grow and build in hazardous areas, environmental intervention methods may actually put more people in harm's way. Recognizing these limitations, North

Carolina prohibits shore-hardening structures in most instances along the coast.

Structural Strengthening Measures

A second set of mitigation strategies involves strengthening existing buildings and constructing new buildings and facilities so that they are more resilient in the event of a natural hazard. Measures such as flood-proofing a building by elevating the structure prevents dangerous floodwaters from damaging the structure. Reinforcing roofs, windows and walls protects the structure from high winds. These methods are often cost-effective ways to protect homes, businesses and community facilities from future hazards.

Non-Structural Measures

The third type of mitigation is termed non-structural and includes a range of activities designed to keep people and property out of harm's way. Non-structural measures include legislation, ordinances, policy directives, and other regulatory means designed to control where and how new development occurs in coastal areas. Federal, state and local governments have all enacted measures to help the people and businesses located in hazardous areas inhabit them in a safer way. For example, under North Carolina's Coastal Area Management Act (CAMA), developers are required to obtain permits before building in designated coastal areas. CAMA also establishes setback regulations, which require that structures be built a designated distance from the ocean. Additionally, CAMA requires that all twenty of North Carolina's coastal counties prepare land use plans, one section of which must address natural hazards, evacuation and hazard mitigation.

Federal measures include the Coastal Barrier Resources Act (CBRA), passed in the 1980s. This act limits federal funding for development on designated coastal barrier islands in order to "minimize the loss of human life, wasteful expenditure of Federal revenues, and damage to fish, wildlife, and other natural resources." Because these areas are so fragile, CBRA eliminated federal assistance to them, though it did not restrict privately funded development. The effect is that while development is not prohibited on barrier islands, it is not subsidized by federal funds.

At the local government level, activities can include planning and land use decisions that incorporate mitigation. By carefully considering the hazards it faces, a proactive community can control its growth so that its level of vulnerability is not increased. This is especially critical on barrier islands fraught with highly vulnerable areas. Here, it is important to maintain principles that direct development and redevelopment to the safer areas. For instance, by instituting policies that limit the extension of water and sewer lines and other public infrastructure, a local government can discourage new development in areas identified as particularly prone to flooding, storm surge and wind damage. By encouraging infill development through tax incentives or other means, communities can maintain more open space on undeveloped dunes, in maritime forests and along estuarine shorelines.

Mitigation programs are much more likely to succeed when residents and business owners are aware of potential disaster and are informed about what they can do both on an individual level and as part of their community.

One of the simplest examples of non-structural mitigation is community outreach and education. Mitigation programs are much more likely to succeed when residents and business owners are aware of potential disaster and are informed about what they can do both on an individual level and as part of their community. Because individuals have a vested interest in a

safer environment, reaching out to the citizenry can be an effective way to move toward community-wide mitigation programs and activities.

Another non-structural technique that is rapidly gaining acceptance as a long-term solution to hazard problems is the acquisition and relocation of homes and other buildings located in vulnerable areas. This strategy involves moving the structure to a safer location, or simply buying the structure for demolition or deconstruction. By doing this, the previously inhabited hazardous areas can be designated as parks or open space, providing a valuable community amenity. Other acquired areas have been allowed to revert back to their natural state, thereby making use of the land's natural mitigative functions. For example, the water-absorbing trees and vegetation of undisturbed wetlands can lessen the impact of flooding, and ocean dunes can naturally deflect the energy of coastal waves and wind when not obstructed or leveled for development. By allowing the return of the land's protective features, we can remove people and property from danger and increase the resiliency of the whole community to future hazards.

North Carolina's Hazard Mitigation Planning Initiative

The North Carolina Division of Emergency Management has a dedicated staff working with local communities across the state to help them formulate and implement hazard mitigation plans that incorporate many of these development management concepts, as well as other mitigation techniques. Through the Hazard Mitigation Planning Initiative (HMPI), the Division is working with its partners at the UNC-CH Department of City and Regional Planning and the North Carolina Center for Geographic Information and Analysis. Together, HMPI partners are making information and technical assistance available to support local efforts to identify hazards, assess vulnerability and create mitigation strategies tailored to address the community's needs and goals. HMPI has provided communities with supporting instructional workshops and information to aid in the mitigation process and is in the process of conducting applied research to determine the most successful non-structural mitigation measures.

Mitigation: Leading North Carolina to Safety

At issue is not the broad philosophical question of development versus conservation. We must accept the fact that most of North Carolina's barrier islands have already been built upon through a market-driven process that is likely to continue. For many local communities, this has brought about an economic boom that could never have been possible otherwise. What is truly important is that the structures that already exist be made as safe as possible, and that new growth be carried out carefully and thoughtfully so as not to exacerbate vulnerability.

It is important to note that mitigation will not prevent our barrier islands from shifting, nor will it prevent coastal storms from ravaging the shoreline. The natural processes that bring about environmental change will continue despite every human effort to contend with them. Rather, mitigation can help island communities to consider these processes when planning for development and making land use decisions. It can strengthen existing buildings and keep more people out of harm's way. It can ensure that recovery from disaster occurs rapidly. And it can create communities that are safer, stronger and more resilient to the impacts of the inevitable forces of nature. CP

For more information on HMPI, or for information on the hazard success stories of our state, contact the North Carolina Division of Emergency Management at 919-715-8000, or on the Internet at http://www.ncem.org.

The Use of Storm Water Rules to Protect Coastal Waters

Rachael Franks

Much of the aesthetic, economic and biological significance of the coastal zone is dependent on the maintenance of high water quality. However, many of the ways in which people enjoy and exploit coastal resources create disruptions in the natural system, jeopardizing the health of the coastal environment. Declines in coastal water quality can have serious repercussions for the ecological integrity of the coastal zone, as well as for the coastal communities that rely on the rich resources found in the zone. In North Carolina, waters that support shellfish beds (SA waters) require the most stringent compliance with water quality standards—standards that are frequently violated.

Although storm water plays an important and indisputable role in declining water quality, it is a very ambiguous culprit. Identifying the exact sources of various pollutants remains problematic. Even when the contaminants are properly pinpointed, managing those sources can prove difficult. Existing legislation clearly prohibits the degradation of water quality, but innovative enforcement and stormwater management techniques have yet to be implemented.

One program undertaken by the Environmental Protection Agency (EPA) has implemented storm water regulations in two sequential stages. These programs initiate requirements to obtain National Pollution Discharge Elimination System (NPDES) permits, which carry with them specific responsibilities for the permit holder.[1] Perhaps these rules can succeed where other poorly conceived, or, more often, weakly implemented water quality rules have failed. At a minimum, they should encourage us to reconsider current water quality management regimes (as states and dischargers consider their liability under the program); and ideally they would provide the necessary catalyst for improvements in storm water management programs, and, ultimately, coastal water quality.

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The NPDES Storm Water Program

Enacted by Congress in 1987 under section 402(p) of the Clean Water Act, management of storm water discharge was to take place in two distinct stages. The first stage, Phase I, began on November 16, 1990. It incorporated municipal separate storm sewer systems (MS4s) serving large or medium sized communities[2] and storm water associated with industrial activity into the National Pollutant Discharge Elimination System.

As a continuation of the process, the EPA was to submit a report to Congress assessing the remaining sources of discharge and establishing methods to sufficiently control storm water discharges and protect water quality. The EPA was originally scheduled to issue supplemental regulations and to create a comprehensive regulatory program no later than October 1, 1992.[3] However, EPA did not fulfill its commitment until recently; Storm Water Phase II Final Rule was signed on October 29, 1999 and first appeared in the Federal Register on

December 8. The rule took effect on February 7, 2000.

The second stage, Phase II, expands upon the initiatives set forth in Phase I by requiring small MS4s in urbanized areas and construction sites that disrupt between one and five acres of land to participate in the NPDES permitting process.[4] Phase I MS4s may adopt the more stringent, updated regulations of Phase II, but they are not required to comply with the new guidelines.[5] In order to satisfy the terms of the NPDES permit, Phase II dischargers must develop and implement a storm water management program comprised of six components:

1—Public Education and Outreach: This control measure has two complementary purposes. First, it is hoped that greater public awareness will result in higher degrees of support and compliance. The public will be more willing to approve funding proposals and volunteer their services if they are supplied with full information about the program and its expected benefits. Also, compliance would likely improve as individuals think about ways in which they might change their own behavior to reduce impacts of storm water runoff.[6]

2—Public Participation and Involvement: A number of benefits could result from increased public participation. For one, involving community members in the decision-making process decreases the probability of opposition or legal disputes. With fewer impediments to the process, implementation of storm water management programs could occur in a more timely fashion. Public involvement could also provide management programs with a number of intangible resources as individuals bring their local expertise, as well as their professional and personal experiences, with them to the process.[7]

3—Illicit Discharge Detection and Elimination: Managers of small MS4s are expected to identify discharges that are not composed entirely of storm water. Non-storm water may enter the system in several ways, including direct wastewater connections, improper oil disposal, laundry wastewaters, and others. Because the separate storm sewer systems are not equipped to accept and discharge water from these other sources, managers should find ways to eliminate their infiltration into the system.[8]

4—Construction Site Runoff Control: This measure requires programs to control pollutants, particularly sediments, loaded from construction sites that have a disturbed area of greater than or equal to one square acre.[9]

5—Post-Construction Runoff Control: Managers of small MS4s must address the problems associated with post-construction runoff, including both the type and quantity of pollutants that are exposed to storm water for transport and the increased delivery of storm water across impervious surfaces. One of the requirements of this measure is an ordinance that mandates post-construction controls to the "extent allowable under State, Tribal, or Local law."[10]

6—Pollution Prevention/Good Housekeeping: This component may prove to be the most important requirement of the Phase II Rule. Under this provision, MS4 operators must evaluate their systems and make changes such that there are reductions in the amount and type of pollution that "(1) collects on streets, parking lots, open spaces, and storage and vehicle maintenance areas and is discharged into local waterways; and (2) results from actions such as environmentally damaging land development and flood management practices or poor maintenance of sewer systems."

The ultimate goal of the NPDES compliant storm water management programs is to reduce pollutant runoff. Each minimum control measure requires identification of one or several best management practices that can be implemented to reach each objective. It is important to recognize that these minimum control measures could serve as a starting point for storm water management in communities that would not otherwise be required to participate in the NPDES permitting process. A comprehensive approach that both mitigates the damage of current activities and initiates measures to prevent pollutant loading will prove effective in the coastal zone. Because some level of development along the coast is inevitable, it is important to identify planning and management practices that are most

conducive to reductions in storm water runoff.

The Potential for Phase II

The effectiveness of the Phase II Rule will largely depend on to what extent states choose to apply it. If the state and/or local government takes initiative and applies the requirements of Phase II more broadly, it could be an important tool to protect coastal waters.

NPDES permitting authorities, in this case the State of North Carolina, are not only required to designate MS4s in urbanized areas, but also must consider any other system that adds a large amount of pollutants to a physically interconnected MS4 that has already been regulated under the NPDES Storm Water Program. Other systems are evaluated by the following suggested criteria:[11]

*Discharge to sensitive waters
*High population density
*High growth or growth potential
*Contiguity to an urbanized area
*Significant contributor of pollutants to waters of the United States and
*Ineffective control of water quality concerns by other programs.

These criteria should not only be applied to MS4s but should also be used to determine the propriety of NPDES permits for other sources that are found to contribute to water quality degradation. The possibility of applying NPDES permits at the community level, perhaps as an oversight of land use plans and other city management proposals, could be an important form of inter-agency enforcement of water quality standards.

Concerned citizens can also influence state oversight by petitioning for stricter controls and invoking the NPDES permit requirement for sources that are not explicitly regulated under Phase II. "Any person may petition the Director to require a NPDES permit for a discharge which is composed entirely of storm water which contributes to a violation of a water quality standard or is a significant contributor of pollutants to the waters of the United States."[12]

It remains to be seen how the Phase II Rule will be implemented in the state of North Carolina. The NC Division of Water Quality initiated a Storm Water Project that began in April 2000 and will continue throughout the summer.[13] With the help of a professional facilitator, multiple stakeholders have been invited to voice their concerns, questions and, most importantly, suggestions about compliance with the new rule. The goal of this collaborative project is to "develop a comprehensive stormwater program based upon the most current and best available science." The Department of Environment and Natural Resources (DENR) hopes the sessions will answer the following questions: 1) How can DENR best protect surface waters from adverse stormwater impacts? and 2) What central management elements are needed? These meetings should play an important role in shaping Phase II implementation.

The Future of SA Waters: A Question of Political Will

Storm water is a major contributor to coastal water quality decline. Because its impacts are largely a function of cumulative effects, more comprehensive controls are needed. Perhaps control at the local level contributes to myopic planning and enforcement. Therefore, because water quality is a matter of state responsibility, North Carolina should examine the discretionary authorities provided to it, not only in Phase II, but in other related water quality rules.

Voices from the environmental and scientific communities contend that there are many measures that can and should be taken to protect coastal water quality. Most of these involve employing stringent land use planning rules and implementating Best Management Practices *before* water quality suffers. Waiting until areas are heavily developed and water quality is severely degraded before thinking about the problem is nothing more than an expensive exercise in futility.

In North Carolina, local initiatives can be used to promote positive change in the coastal zone. However, creating and enforcing those initiatives will be a game of political will. State-level agencies in Raleigh are reluctant to become involved in the unpopular task of imposing

zoning requirements and other quality controls on coastal communities. These communities have produced land use plans in accordance with the Coastal Area Management Act (CAMA) in the past. However, the fact that water quality problems persist in SA waters and threaten to make waters unsuitable even for swimming shows that those communities have either insufficiently provided for water quality maintenance or have chosen to disregard their plans. While land use planning falls squarely in the local realm, the responsibility of protecting water quality lies in the hands of the state. This separation of power makes it easy to point fingers, but difficult to establish practices that will maintain and restore SA waters. Many solutions will prove politically difficult in this gray area where federal, state and local authority overlaps—or rather in this case, falls short.

If the state wishes to uphold its responsibility to protect water quality, it must provide incentives for its coastal communities to adopt and enforce land use practices that prevent the creation of extensive networks of impervious surfaces. One powerful incentive may be the issuance of NPDES permits, as allowed under the Phase II Final Rule. However, since many of North Carolina's seaside municipalities will not be automatically designated, the Rule may have limited effect. North Carolina has an opportunity to uphold its legal responsibility to preserve water quality. Issuing NPDES permits would be preferable to waiting for additional storm water-induced violations. In addition to the environmental benefits of better water quality, state and local governments would enjoy the practical benefits of reduced legal accountability for water quality violations and more latitude than would be afforded under more restrictive stipulations.

EPA's stated objective of the Storm Water Phase II Final Rule is to "preserve, protect, and improve" water quality. This objective would be better fortified by explicitly requiring NPDES-compliant storm water programs as a component of approved land use plans. Mandatory issuance of permits and an enforceable schedule for compliance are important steps toward more comprehensive and meaningful regulation. Strengthening of the storm water rule could be incorporated into revised CAMA land use rules or accomplished elsewhere at the state level. To date, local planners have insufficiently prepared for the effects of storm water pollution, evidenced by developments that have quite literally paved the way for poor coastal water quality.

Many people feel that the Phase II Rule is a positive and important step in storm water regulation. One of greatest benefits of the rule is the necessary re-evaluation of existing policies and programs and incorporation of the Phase II requirements. Even in areas where the NPDES permit will not be invoked, the state may see fit to require the six minimum control measures as a way of ensuring that SA standards are met. Agencies with the specific charge of maintaining coastal water quality would benefit by expanding Phase II-type programs to fulfill their responsibility to protect and restore shellfish waters in compliance with state standards. The Phase II guidelines could be an important set of rules, providing a comprehensive, feasible set of BMPs that are designed to not only resolve existing storm water runoff problems, but also to prevent pollution. Pollution prevention can be achieved through structural best management practices, zoning activities, land acquisition, and perhaps most importantly; through changes in personal philosophy that recognize the role each of us plays in contributing to storm water pollution through our daily lifestyles.CP

Notes

[1] The National Pollution Discharge Elimination System is a program for "issuing, modifying, revoking and reissuing, terminating, monitoring, and enforcing permits, and imposing and enforcing pretreatment requirements." All point sources of pollution must attain or maintain the specific applicable water quality standards of the region in order to receive NPDES permits. The program requires that states issue permits to limit effluents, including the quantity, discharge rate, and concentration of each pollutant. The issuance of NPDES permits usually means a collaboration at the state and federal level. The permits must be consistent with the guidelines of both, but monitoring and compliance requirements may differ. General Services Administration, "Effluent

Limitations and the NPDES." December 1998. http://gsa.gov/pbs/pt/call-in/factshet/1298a/12_98a_13.html.

[2] "Municipal separate storm sewer" as defined in 40 CFR Chapter 1 § 122.26 (b)(8) is a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains). Large communities are those with greater than 250,000 inhabitants; medium sized communities have greater than 100,000 residents and less than 250,000.

[3] "The program is required to establish: (1) priorities; (2) requirements for State storm water management programs; and (3) expeditious deadlines." EPA, "Chapter 4: Management Measures for Urban Areas." www.epa.gov/OWOW/NPS/MMGI/Chapter4/ch4-1.html.

[4] Small MS4s are those serving communities of less than 100,000 residents. http://www.epa.gov/owm/sw/phase2/index.htm Urbanized areas are defined as "a land area comprising one or more places—central place(s)—and the adjacent densely settled surrounding area—urban fringe—that together have a residential population of at least 50,000 and an overall population density of at least 1,000 per square mile." Determination of population and density is based on census blocks. "Urbanized Areas: Definition and Description," EPA 833-F-00-004, Fact Sheet 2.2.

[5] "Storm Water Phase II Final Rule," EPA 833-F-00-001, Fact Sheet 1.0, January 2000.

[6] "Public Education and Outreach Minimum Control Measure," EPA 833-F-00-005, Fact Sheet 2.3, January 2000.

[7] "Public Participation and Involvement Minimum Control Measure," EPA 833-F-00-006, Fact Sheet 2.4, January 2000.

[8] "Illicit Discharge Detection and Elimination Minimum Control Measure," EPA 833-F-00-007, Fact Sheet 2.5, January 2000.

[9] "Construction Site Runoff Control Minimum Control Measure," EPA 833-F-00-008, Fact Sheet 2.6, January 2000.

[10] "Post-Construction Runoff Control Minimum Control Measure," EPA 833-F-00-009, Fact Sheet 2.7, January 2000.

[11] "Proposed Storm Water Program Coverage for Regulated Small MS4s," http://www.epa.gov/owmitnet/sw/ms4/small/coverage/index.html.

[12] EPA 40 CFR Chapter 1 § 122.26 (f)(2).

[13] "N.C. Division of Water Quality Stormwater Project." http://h2o.ehnr.state.nc.us/.

Rebuilding After Floyd?: CRC Regulations and Redevelopment Options Available to Littoral and Riparian Owners

Aaron M. McKown and Donna D. Moffitt

In the early morning hours of September 15, 1999, Hurricane Floyd ripped into North Carolina, pounding away at fragile beaches and dumping more than a foot of rain. When the skies finally cleared, almost one-third of the state was affected by flooding and heavy rains, more than a million residents were without power, hundreds of beach homes had been damaged or destroyed, and the total property damage for the state was estimated at more than $700 million. In addition, Floyd's fifteen-foot storm surge destroyed sand dunes and vegetation used to determine the setback line for oceanfront development along some beaches, thus relocating the invisible baseline significantly inland. As a result, dozens of homes severely damaged by Floyd's fury may now be designated as non-conforming uses, thereby prohibiting these landowners from rebuilding. This article focuses on several post-hurricane issues regarding development along North Carolina ocean shorelines that have emerged in the wake of Hurricane Floyd.

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Distinguishing Between Public and Private Property Along Oceanfront Shorelines

In North Carolina, the State retains title to lands subject to the flow of the Atlantic Ocean up to the mean high tide line (MHTL).[1] According to the North Carolina Supreme Court, the MHTL constitutes the boundary between private lands and State-owned public trust lands along ocean or inlet shorelines.[2] This boundary is ambulatory and moves with erosion and accretion.[3] Because of the MHTL's ambulatory nature, the Division of Coastal Management (DCM) uses the presence of natural indicators of high water, such as the location of the vegetation line and trash line and observation of actual high tide, to determine the boundary's approximate location.[4] When these indicators are disturbed as a result of a storm, the DCM establishes the MHTL by using available indicators, such as the vegetation line on adjacent lots and aerial photography. This methodology was expressly upheld in Webb v. Coastal Resources Commission.[5]

The validity of these indicators stems from the recognition that public trust rights have traditionally extended to the entire beach strand seaward of the first line of natural, stable vegetation or frontal dune.[6] North Carolina General Statute § 77-20(d) recognizes that because the "public [has] made frequent, uninterrupted[,] and unobstructed use of the full width and breadth of the ocean beaches of [North Carolina] from time immemorial," the public retains the right "to the customary free use and enjoyment of the ocean beaches."[7] This legislative recognition functions as a codification of common law doctrine of custom.[8] The public's right to access and use oceanfront and

estuarine shorelines is recognized in several other North Carolina statutes as well.[9]

Establishment of Setback Requirements Along North Carolina's Oceanfront Shorelines

In establishing setback requirements and other natural hazard mitigation regulations, North Carolina's Coastal Resources Commission (CRC) recognized that North Carolina was subject to annual threats from severe storms as well as constantly shifting coastlines resulting from long-term erosion associated with sea level rise. Although the CRC realized that it could not provide development located adjacent to the coast with absolute safety "from the destructive forces indigenous to the Atlantic shoreline,"[10] it understood that it could reduce unreasonable danger to life and property through the implementation of stringent management policies and standards. As a result, the CRC enacted various regulations that attempt to guide development or redevelopment in ocean hazard areas while balancing the financial, safety and social factors involved in hazard area development. In addition, the CRC's regulations attempt to ensure access to public trust lands, which can be hampered by debris and non-conforming structures left on the beach after severe storms. Such regulations require specific limitations and conditions on private ocean area property. However, the public tends to focus on these regulations only after severe storms, when heavy erosion shifts accepted boundaries among the ocean, public beach and private property.

Erosion at Nags Head, North Carolina
David Brower

Before discussing the various options available to both the State and private landowners after a hurricane, it is useful to detail the significant regulations applicable to ocean hazard areas. The most important of these is the requirement that oceanfront development adhere to certain setback restrictions. The CRC rules require that a setback line be established at a minimum distance from the first line of stable, natural vegetation according to the size of the structure. For all single family residences and other structures that have 5,000 square feet of total floor area or less, the setback line is determined by multiplying the annual erosion rate by thirty.[11] At minimum, this line must be at least sixty feet from the first line of stable, natural vegetation. In contrast, because larger structures pose increased risk to life and property and are more likely to increase public expenditures, structures that have more than 5,000 square feet of total floor area are subject to greater setback requirements. For these structures, the setback requirement is twice that of smaller structures and under no circumstance is to be less than 120 feet from the first line of stable, natural vegetation. Because of the instability associated with North Carolina's shoreline, a vegetation line determination is only valid for sixty days and is normally set only at the time that development is proposed on an oceanfront lot.

Post-Hurricane Scenarios and Landowner Options

Because of the destructive forces associated with hurricanes, shorelines can erode dramatically during such storms. Post-hurricane damage generally results in one of three scenarios: (1) the existing structure or vacant lot falls landward of the post-hurricane vegetation line but within the minimum setback area; (2) the existing structure becomes imminently threatened by coastal waters but remains on private property; or (3) the existing structure or vacant lot becomes located on public beaches or in public waters. Each one of these three scenarios gives rise to unique options and difficulties for both the State and private landowners.

The CRC provides two sets of rules for

existing structures that become located landward of the vegetation line but seaward of the minimum setback area as a result of a hurricane. North Carolina General Statute § 113A-103(5)(b)(5) allows a landowner to conduct "maintenance or repairs (excluding replacement) necessary to repair damage to structures caused by the elements . . . " The CRC rules define "replacement" as those structures that suffer damage in excess of fifty percent of the structure's value.[12] Therefore, a property owner whose existing structure is damaged at less than or equal to half its value (as determined by the local building inspection office) can institute repairs without having to obtain a development permit. In contrast, those structures that have suffered damages in excess of half their value must obtain a permit from the DCM or local government stating that it meets current setbacks before any structure can be rebuilt.

With regard to vacant lots, the CRC's rules allow for the development of single-family residential structures seaward of the applicable setback line in ocean erodible areas if each of the following conditions is satisfied: (1) the development is set back from the ocean to the maximum extent feasible and the development is designed to minimize encroachment into the setback area; (2) the development is at least sixty feet landward of the vegetation line; (3) the development is located entirely behind the landward toe of the frontal dune; and (4) specific design standards are incorporated into the development.[13]

For those lots located closer than sixty feet from the vegetation line, the only immediate option available to a landowner whose severely damaged structure or lot falls within the sixty-foot setback area is to seek a variance from the CRC once the landowner receives a final decision denying his or her CAMA permit. In order to be successful, the variance petitioner must show that each of the following circumstances exists: (1) that enforcement of the applicable development guidelines or standards will cause the landowner practical difficulties or unnecessary hardships; (2) that such difficulties result from a condition peculiar to the landowner's property; (3) that such conditions could not have reasonably been anticipated by the CRC when the applicable guidelines or standards were adopted; and (4) that the proposed development is consistent with the spirit, purpose and intent of the CRC rules.[14] The substantial difficulty in obtaining a variance is showing that the CRC did not reasonably foresee the condition as peculiar to the landowner. When the CRC adopted the setback requirements, it was most likely aware of the possibility that certain ocean area properties might be deemed unbuildable after a severe storm. As a result, the variance procedure may not provide relief to all landowners with damaged structures or unbuildable lots.

Other options are available to a landowner whose property has been deemed unsuitable for development. The landowner can wait to see if the beach naturally recovers, thus re-establishing the vegetation line further seaward. Another option is to plant, water and fertilize beach vegetation to encourage the re-establishment of stable, natural vegetation further seaward. A third choice is to seek means of artificially nourishing the beach. The problem with beach nourishment, in addition to the expense and long preparation time, is that the first line of stable, natural vegetation becomes permanent at the time nourishment commences, thus providing few tangible or immediate benefits to landowners of unbuildable lots.

Another option available to landowners is to hope that the local government will acquire their property under a grant from DCM's Public Beach and Coastal Waterfront Grant Program, which provides land acquisition priority to those lands that have been made unsuitable for development as a result of natural hazards. The final option for landowners of unbuildable property is to donate their land to the State, the local government or a qualified non-profit organization in return for a tax credit under the Conservation Tax Credit Program operated by the Department of Environment and Natural Resources (DENR). The landowner can decide, based on these options, whether he or she wishes to keep the property or be compensated for his or her loss. This is particularly advantageous to landowners because it is presumed that they purchase oceanfront property with full

knowledge of the potential dangers posed by hurricanes. Moreover, the original developers are required, as a condition of the development permit, to acknowledge the fact that they are seeking to build in a hazardous area with limited suitability for permanent structures and thus are assuming the risk associated with such development.[15]

Imminently Threatened Structures

The next category of oceanfront structures that raise unique issues following a hurricane is those that are deemed as "imminently threatened oceanfront structures." A structure is imminently threatened when the erosion scarp reaches within twenty feet of the structure.[16] When a structure becomes "imminently threatened," the landowner's options are considerably limited, primarily because permanent erosion control structures (or beach hardening devices) are prohibited.[17] As a result, the property owner is restricted to implementing temporary erosion controls until he or she can either relocate the threatened structure or until the affected local government can initiate a successful beach nourishment program. Under the CRC rules, there are two types of temporary erosion control techniques available to protect imminently threatened structures that can be employed either exclusively or in conjunction with one another: the use of sandbags and beach bulldozing.

The use of sandbags is intended to temporarily protect residences, septic tanks or roads but may not be used to protect appurtenances such as gazebos or decks.[18] If a landowner decides to pursue this option, a CAMA permit is required before the sandbags may be placed in front of the threatened structure. Under the rules, the sandbags may remain in place for up to two years if the structure is 5,000 square feet or less, and up to five years for those structures that are either over 5,000 square feet or in a community that is engaging in a beach nourishment project.[19] Once the sandbags are determined to no longer be necessary, the property owner has thirty days to remove them.[20] In addition, an imminently threatened structure may only be protected once, regardless of ownership.[21] The only exception to these requirements is if the sandbags become covered with sand and stable, natural vegetation, in which case they may remain in place indefinitely unless subsequently revealed by another storm.[22]

The other temporary erosion control option available to landowners is beach bulldozing. The CRC rules provide for a statutory exemption that allows beach bulldozing to occur without a CAMA permit as long as the structure is considered imminently threatened and the bulldozing does not remove material located seaward of the low water line. The landowner, however, must still obtain a permit from the U.S. Army Corps of Engineers. Although a CAMA permit is not required, beach bulldozing must still adhere to certain regulations. For instance, the bulldozing may not move material in excess of one foot in depth from the original surface elevation. More importantly, there is a federal moratorium on beach bulldozing during the sea turtle nesting season (May 1- Nov. 15), although a recent CRC rule change would permit DCM, in coordination with state and federal agencies, to determine if any turtle resources exist in an area after any given storm.[23] If no turtle resources are identified, then the property owner would be permitted to commence bulldozing in the area during the moratorium for that particular year only.

Structures and Debris on Public Beaches After a Storm

The last category of oceanfront property involves those structures and debris that are located on public beaches after a storm. North Carolina applies public trust rights to its beaches seaward of the vegetation or dune line on public property. Moreover, all wet sand areas below the mean high tide line are public property. After major storms, the public beaches and nearshore waters are typically littered with debris from damaged homes and other structures. In addition, storm surges and the associated erosion occasionally result in the collapse of structures on the public beach or in the nearshore waters. This debris creates hazards to the public's health and safety while also severely limiting access to

public beaches and waters.

In recognizing the risks imposed by debris and damaged structures, the General Assembly delegated local and county governments the authority to include damaged structures and debris within their definition of public nuisances. By including damaged structures and debris within a nuisance definition, local and county governments may exert their police powers to require landowners to remove these items from public beaches or waters or to repair or remove structures that are in danger of collapsing. If the landowner refuses to eliminate the nuisance, the local or county government may remove or correct the nuisance and then seek restitution

Collapsed pier on Pine Knoll Shores, North Carolina
NC Division of Emergency Managment

from the property owner for the costs incurred. In addition to local and county authority, the landowner's original CAMA permit is required to include a written provision whereby the landowner agrees to remove or relocate any structure that becomes imminently threatened by changes in the shoreline.[24] Failure to comply with a permit condition requiring removal of a damaged structure may result in injunctive relief and/or civil or criminal penalties.

In addition to local and county authority to remove damaged structures and debris, DENR may possess the implicit authority to secure the removal of such items when local and county governments are unable to do so. Although this authority has yet to be applied in a public beach setting, North Carolina General Statute § 113-131 provides both DENR and the Wildlife Resources Commission with the broad responsibility of protecting "public trust resources." Public trust resources include "land and water areas, both public and private, subject to public trust rights . . . ."[25] These agencies may request the Attorney General to bring an action "for injunctive relief to restrain the violation and for a mandatory preliminary injunction to restore the resources to an undisturbed condition."[26] Even though this authority permits the agencies to require the removal of damaged structures and debris from public beaches and waters, the statute does not provide a cost recovery provision if the agencies remove the items themselves.

A more difficult question arises when erosion results in a structurally sound building being located on a public beach. When this occurs, there is unmistakably an interference with the public's use and enjoyment of the beach or in public waters. The problem is that the structure does not fall within the traditional nuisance definition in that it does not pose any clear danger to the public's health, safety or welfare. North Carolina courts have yet to address this issue, but a federal district court in Texas held that although the public retains an easement for recreational use that migrates with the vegetation line, that easement does not justify an unreasonable interference with the property rights of the fee owner.[27] As a result, the court held that the public's easement existed around the property owner's existing structure. The question that arises, which was not addressed by the district court, is what property rights a landowner retains if his or her structure becomes located on public property, not merely within privately owned public trust lands. CP

Notes

[1] See Carolina Beach Fishing Pier, Inc. v. Town of Carolina Beach, 277 N.C. 297, 177 S.E.2d 513 (1970) (holding that the boundary between private property and State-owned public trust lands along an ocean or inlet shoreline is the mean or ordinary high water mark).

[2] See id.

[3] See State v. Johnson, 278 N.C. 126, 179 S.E.2d 371 (1971); Shell Island Homeowners Assoc. v. Tomlinson, 134 N.C. App. 217, 517 S.E.2d 406, 414-15 (1999); see also F. Maloney & R. Ausness, The Use and Legal Significance of the Mean High Water Line in Coastal Boundary Mapping, 53 N.C. L. Rev. 185, 224-26 (1974) (explaining the law of erosion and accretion and ambulatory boundaries). The exception to the general rule regarding ambulatory boundaries is when there is accretion as the result of a beach nourishment project. Under these circumstances, title to the beaches expanded through beach nourishment "remain open to the free use and enjoyment of the people of the State, consistent with the public trust rights in ocean beaches, which rights are a part of the common heritage of the people of [North Carolina]." N.C. Gen. Stat. § 146-6(f).

[4] N.C. Admin. Code Rule 15A 7H.0106(1) (defining "normal high water" as "the ordinary extent of the high tide based on site conditions such as presence and location of vegetation, which has its distribution influenced by tidal action, and the location of the apparent high tide").

[5] Webb v. Coastal Resources Comm'n, 102 N.C. App. 767, 404 S.E.2d 29 (1991) (holding that the determination of the approximate MHTL by reference to physical markers, such as the vegetation line, was consistent with the intent of the North Carolina Supreme Court in Carolina Beach Fishing Pier).

[6] See N.C. Gen. Stat. § 77-20(e).

[7] Id. at § 77-20(d).

[8] In order to establish the customary use over beachfront property, the following requirements must be shown: 1) a long and general usage; 2) without interruption by private landowners; 3) that is peaceful and free of dispute; 4) which is reasonable; 5) the nature of which is certain as to its scope and character; 6) without objection by landowners; and 7) is not contrary to other customs or laws. See Oregon ex rel. State Land Board v. Corvallis Sand & Gravel Co., 429 U.S. 363 (1977) (applying the common law doctrine of custom to hold that public trust lands included all of the dry sand beaches in the entire state of Oregon).

[9] See, e.g., N.C. Gen. Stat. § 1-45.1 (defining public trust rights to include the right to freely use and enjoy the State's ocean and estuarine beaches and access to those beaches); N.C. Gen. Stat. § 113A-134.1 (establishing the public beach access program and recognizing that "the ocean beaches are resources of statewide significance and have been customarily freely used and enjoyed by people throughout the State").

[10] N.C. Admin. Code Rule 15A 7H.0303(a).

[11] See id. at 7H.0306(a)(2), (4).

[12] See id. at 7J.0210.

[13] See id. at 7H.0309(b)(1)-(4).

[14] See id. at 7J.0211(c)(2)(A)-(D).

[15] See id. at 7H.0306(j).

[16] See id. at 7K.0103(a).

[17] See id. at 7H.0308(a)(1)(B).

[18] See id. at 7H.0308(a)(2)(C).

[19] See id. at 7H.0308(a)(2)(F).

[20] See id. at 7H.0308(a)(2)(G).

[21] See id. at 7H.0308(a)(2)(L).

[22] See id. at 7H.0308(a)(2)(H).

[23] See id. at 7H.1805(f).

[24] See id. at 7H.306(l).

[25] N.C. Gen. Stat. § 113-131(e).

[26] N.C. Gen. Stat. § 113-131(c).

[27] See Hirtz v. Texas, 773 F. Supp. 6, 10 (S.D. Texas 1991), vacated on other grounds, Hirtz v.Texas, 974 F.2d 663 (5th Cir. 1992) (dismissing case because barred by the Eleventh Amendment, holding that although individuals may sue state officials in their capacity as state representatives, the Eleventh Amendment precludes suit against the state itself).

Master's Projects

The following is a list of Master's Projects prepared by students who graduated from the Department of City and Regional Planning at UNC-Chapel Hill in 2000. To obtain a copy of one or more of these projects, contact Patricia Coke at (919) 962-4784.

Laurie Actman. The Development and Economic Impact of Inner-City Supermarkets

Elliott D. Barnett. When Worlds Collide: The Convergence of the Land Use Planning Systems of the Netherlands and the State of Oregon

Kristin C. Boesch. The Barataria-Terrebonne National Estuary Program: A Case Study of Ecosystem Management

Brian B. Byfield. Financing Conservation from Overseas – An International Lesson for Jamaica

Jeffrey V. Caiola. Community Organizing: Is it Vital to Community Development Corporations and Compatible with Economic and Physical Development Goals of CDCs?

Phillip S. Conrad. Integrating Land Use and Transportation: A Comparison of Oregon and Florida

John Griffith Davies. Toward a Unified Land Use—Transportation Planning Process

Marc C. deBree. Tools and Strategies for Responding to Sea Level Change in the Caribbean's Lesser Antilles

Erin E. Dissly. Making the Land Use-Transportation Connection in Raleigh, NC: Planning and Implementation of Transit Station Areas

Joshua Drucker. American and Australian Urban Forms: A Comparison of Structure, Determinants, and Consequences

Susan Exline. Unmet Demand for Smart Growth Developments: An Assessment of Consumer Preferences

Scott William August Ferguson. Principles of a Successful Waterfront Development

Rebecca A. Fox. Neighborhood Indicators in East Burlington: An Assessment for the Community Indicators and Survey Subcommittee

Joann Alberts Garvin. T.O.D. in the Triangle: What Can We Learn from Other Cities' Experience with Transit?

Philip L. Hervey. Design Regulations for Revitalizing Downtown Durham

Jonathan Matthew Hull. University-Based Economic Development Centers: Best Practices and Recommendations to the Center for Economic Development at Carnegie Mellon University

Matthew R. Jesick. Chapel Hill's Short Range Transit Plan: A Comparison of Theory and Practice

Clifford M. Kenwood. New Urbanism: Repackaged Suburbs or a New Vision for Neighborhood Design?

Cynthia Langlykke. The Benefits of Workforce Integration and Housing Concentration for Immigrant Groups, with Related Policy Inferences Drawn from Immigration Trends in Germany and Berlin

Laurence Vernon Lewis. Bicycle and Pedestrian Access to Transit: A Case Study Analysis

Jennifer Stubblefield Lobenhofer. Self-Help Credit Union Commercial Lending: A Preliminary Impact Assessment

Jeffrey Adams Masten. Toward an Integrated Wetland Mitigation Banking Policy at the North Carolina Department of Transportation

Katherine O'Prey. Evaluation of Chapel Hill Watersheds: Impervious Surface Cover as Stream Health Indicator

Megan Ariana Owen. Water Quality Protection and Zoning, Subdivision, and Stormwater Ordinances: An Evaluation of Selected North Carolina CAMA Communities

Timothy William Owen. Land Protection Planning and Scenic Quality Along the Blue Ridge Parkway in Watauga County, North Carolina

Leslie Parrish. Downtown Revitalization Through Artist Niches: A Feasibility Guide

Peter J. Ray. Developing an Adequate Public Facility Program in North Carolina

Anna Wood Readling. Habitat Protection in the Cane Creek Watershed: A Recommendation Based on Ecological Principles

Lisa Christine Roberts. Community Development and School Improvement: Supporting Partnerships Between Communities and Schools

Angela C. Siefkes. Are Truck-Involved Crashes More Frequent and Severe During Work Zones?

Eve Carlisle Stewart. Examining the Need for FHA's 203(k) Mortgage Insurance Program

Caroline Elizabeth Wells. An Evaluation of the Southside Area Development Plan—Greensboro, North Carolina

Anita Stephenson Watkins. Cumulative and Secondary Impact under NEPA.

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